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ABSTRACT

To evaluate the non-economic returns to investment of resources in education, a study was conducted to determine the effect of farm management instruction on attitudes toward education and farming, relationships existing between attitudes and farm income, and whether students' attitudes became more like their instructor's with increasing years of instruction. The groups in the study were: (1) farm families who submitted records for analysis in the 1967 Minnesota Farm Management Program, (2) farm families who had dropped out of the program later than 1964, (3) farm families selected at random from 10 counties, and (4) agriculture instructors responsible for farm management programs. The 70 percent response to the 90-item attitude instrument revealed a general improvement in attitudes related to more years of instruction, with a strong suggestion of diminishing marginal returns. Families in other than well-organized programs had scores negatively related to instructors; in well-organized programs scores were positively related. All differences in attitudes were very slight. There is a need for a revision of methods, subject matter, or both if adult vocational agriculture instructors want to claim significantly-improved attitude as a product of their educational program. (DM)

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A FINAL REPORT

Project No. 0E7-1050
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ATTITUDES TOWARD ENTREPRENEURIAL BEHAVIOR AND EDUCATION - THEIR RELATIONSHIP TO INSTRUCTION

September 1969

UNIVERSITY OF MINNESOTA
DEPARTMENT OF AGRICULTURAL EDUCATION

College of Education
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by

Howard M. Kittleson
September, 1969

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FOREWORD

What are the consequences of education? This is the central question in most educational inquiries. Most often the question leads to the ascription of values or a relationship between the input costs and the output values of a prescribed process for a specific kind of learner engaged in some learning itinerary. In economic terms, that is in the effort to ascertain economic returns, the chicken-egg dilemma arises. Which comes first, education or income? What is the stimuli and what is the response?

This inquiry employs economic rationale and it attempts to gauge changes which are ordinarily regarded as non-economic. If a learning itinerary increases the capability to win a larger income, what parallel changes occur as attitudinal changes? This is the central question of the present inquiry. It is one of a meager number of inquiries which have begun as attempts to relate the affective domain with the empirical realities of cost-effectiveness. It is presented as a descriptive study. Apart from its specific findings its major contribution is in pressing the methodological frontiers for the important question, what are the consequences of education?

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SUMMARY

Education is an investment of resources. Empirically specifying the returns to investments in education is the most arduous task when using the tools of economics to study the inputs and outputs of education. The most common measure is income, and few researchers have attempted to measure non-economic returns.

There were three specific questions which the study attempted to answer: What is the effect of farm management instruction on attitudes toward education and farming? What relationship exists between attitudes and farm income? Do students with more years of instruction have attitudes more like their instructors than students who are just beginning?

Vocational agriculture departments in Minnesota public secondary and area vocational-technical schools offer farm management education programs for adults. With classroom and on-the-farm training, the farm family learns how to accumulate and analyze farm business data in a manner that provides a basis for making management decisions. Educating for the technical competence necessary to act on decisions relevant to individual and family goals is also a part of the program objective.

There were four groups of people in the study. One group was farm families who submitted records for analysis in the 1967 Minnesota Farm Management Program. The second group was farm families who had dropped out of the program in 1964, 1965, or 1966, after having submitted varying numbers of records for analysis. To control sample size, a random sample of families within each sampling category (defined as number of years in which families analyzed their farm record) provided the subjects for study. In some cases especially in the eighth, ninth and ten-or-more years of participation categories, the small number of analyzed records required that all families in those categories be subjects.

The third group of farm families served as a control group. The names of approximately 20 farm families selected at random came from each of ten randomly chosen Minnesota County Agriculture Stabilization and Conservation Service (ASC) offices. They had never submitted records for analysis in a Minnesota farm management program.

The fourth group was the agriculture instructors responsible for adult farm management programs in which the farm families were enrolled.

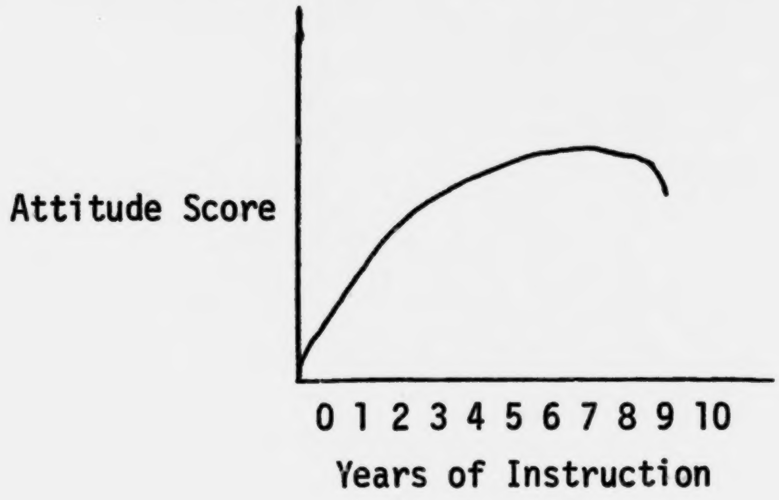
The attitude instrument was developed by presenting a list of 300 positive and negative statements about education and farming to a small pilot group of farm families. On the basis of item clarity and discrimination, the tentative list was reduced to 41 items measuring education attitudes and 49 for farming. The subjects responded to each statement with one of five response alternatives ranging from strongly agree to strongly disagree.

Nearly 70 percent of all the people reached by the mail questionnaire responded after two follow-up mailings. The total number of farm families represented by the return was 533.

Attitude measurements were made in three ways. A statistical technique called cluster analysis was used to determine which items could estimate the several dimensions of each attitude scale. The second measurement used was the total education attitude scale score and the total farming attitude scale score. A third approach was to factor analyze the item response intercorrelations to determine what underlying dimensions several groups of items could estimate based on their common variance. In each of the three cases, scores were derived after reassigning the item response weights to maximize internal consistency.

The attitude scores used as dependent variables in the study were obtained by summing the individual item scores for each person for each of the relevant subscales or the total scale. The other dependent variable, farm income, came from another study of farm management in Minnesota. Independent variables were two: the number of years of farm management instruction and attitude scores (as previously defined). Curvilinear regression was the primary statistical analysis technique.

Most of the significant findings of the study were presented as curves relating the independent and dependent variables. The general form was as shown in the following figure:



The results of the study should generalize reasonably well to all farm families in Minnesota because of the similarities between those who did and did not respond to the questionnaire and because of the similarities between farm families in farm management programs and farm families with no farm management training. All results, however, need to be tempered with two limitations: (1) the descriptive, not predictive nature of the study, and (2) the accuracy of the instrument.

There was not a strong statistical relationship between attitude scores and years of instruction. There was a general improvement in terms of more positive attitude scores related to more years of instruction, but in several instances there was a strong suggestion of a diminishing marginal returns effect. The significant findings were based on the cluster analyzed items: neither the factor analysis subscales nor the total scores provided significant or consistent results.

The cluster analysis subscales showed generally positive relationships with farm income. None of the regression equations relating income and attitude scores from the factor analysis subscales or total attitude scale scores showed statistical significance.

There was no clear relationship between student and instructor attitude scores at one point in time for all students and instructors or according to the number of years of instruction. There was a difference, however, in the direction of the correlation depending on the intensity of the instruction program. Families in other than well-organized programs had scores negatively related to instructors; well-organized program student and instructor attitude scores were positively related.

To determine if income and attitudes were similarly related to instruction, that relationship was investigated for all farm families and for those in well-organized programs. The income response to instruction was found to be generally positive and about as accurately predicted as the attitude response. There was a difference, however, between the shapes of the performance curves in this study and those from a previous study of farm management in Minnesota. The apparent contradiction, however, was a result of different methodologies: the two studies involved two different ways of investigating the same problem.

If adult education for farm families can influence the probabilities of rural youth seeking post high school education, the benefits of instruction accrue not only to the participants and their children, but to society as a whole.

Since the differences in attitudes were very slight, if adult vocational agriculture instructors want to claim significantly improved attitudes as one of the products of their education program, there is a need for a revision in methods, subject matter, or both. This type of attitude research in other education programs might well point out the same fact: if social benefits such as attitude changes are a desirable end product, there must be a change in the education process.

This research verified the findings in another study of the economic returns to investments in Minnesota farm business management. The initial study had shown a diminishing marginal return during a three year period of instruction. This study also found a diminishing marginal rate of return for income, but it occurred after more years of instruction and involved only families in well-organized programs.

Although there is much to be learned about entrepreneurship, the results of this study suggest that both income and attitudes respond in a similar way and to a similar degree to education inputs. The findings not only suggest that attitudes are a dimension of entrepreneurship but that if income is the criterion, the attitude scales have empirical validity. Students in farm business management seem to be benefiting from instruction in the art and science of achieving an optimum mix of land, labor and capital for the purposes of profit-making.

CHAPTER I

INTRODUCTION AND THE PROBLEM

Introduction

While the proportion of the population actively engaged in farming in the United States declines, there are concomitant changes in the nature of the farming enterprise which require an increased level of entrepreneurial skill among those who remain in farming. Farm businesses are becoming larger in both acreage and amount of capital investment. Recent research progress in agriculture technology is compelling farmers to manage resources much more complicated and costly than the horse and plow of a past generation. How capably the farm population will meet the challenge of change depends on whether it is possible to make other kinds of research progress in agriculture - research progress penetrating behavioral barriers to social and technological advance.

A human obstacle to sophisticated farm methods and machines is the ability and desire to be an entrepreneur, a person who organizes and manages a business undertaking and assumes the risk for the sake of profit. Dimensions of entrepreneurial skill include attitudes toward farming as a business, rationality, risk, profit, innovation and education. If there is a need for encouraging and training the farm population to be competent, to successfully compete, and to produce, can instruction help farm families develop such an orientation? Does formal education encourage entrepreneurial behavior, or is the relatively low level of education in the farm population an economic advantage?

To help farm families meet the challenge of change, agriculture educators in Minnesota have designed a program of farm management instruction to improve farm family entrepreneurial skill by keeping accurate, detailed records and through year-end farm business analyses. With classroom instruction and individual counsel from the adult vocational agriculture instructor, the farm family records all expenses and incomes related to its farm operation as well as accounting for amounts of feed, seed, fertilizer and other productive inputs.

At the end of the calendar year the families send their record books to an analysis center where computers analyze the farm business to reveal which enterprises yielded profits and to report costs per unit of production. In April of each year the farm families receive a booklet listing their own costs, income, and efficiencies for the previous year. Also appearing in the booklet are averages of the more profitable farms and less profitable ones to show families how they compare with other farm operations in their area of the state. These summaries serve not only as a tool for decision-making in farm business reorganization, but as a teaching media for the instructors. To rationally assign resources to the parts of the farm business which prove most productive, the farmer and his instructor need the yearly analyses for evaluating possible changes in the farm business.

Minnesota investigators have shown a positive relationship between years of farm management instruction and farm income by gathering data from year-end summaries of the farm business. Cvancera (1) matched 33 farm families in farm management instruction programs with those who were not and suggested a possible diminishing returns effect in the first three years of instruction. To test Cvancera's hypothesis, Swanson, Persons, Kittleson and Leske (2) studied in detail all the Minnesota record summaries from 1959 through 1965. They found that the rate of increase in farm income did decline after the first several years of instruction, but that income increased at an accelerating rate from approximately the sixth through the tenth years. It seems clear, then, that farm families benefit economically from farm management education, but what caused the higher levels of profits?

Many factors influence the level of farm family incomes. Some influences are economic and natural phenomena such as natural business growth, changes in the general economy, price cycles, and uncontrolled forces of nature. Other factors depend more on personal characteristics of the farm family. The challenge is: how effectively can farm families utilize their potential to achieve a satisfactory level of income?

Because a change in attitudes toward farming and education is a logical and necessary antecedent or at least accompaniment to increase in farm income resulting from instruction, it is important to study attitude change to determine its magnitude and direction.

The Problem Delimited

There is more to being a successful farmer than having available an economic analysis of a farm business. To meet the challenge of change in agriculture, farm families must develop attitudes that will enable and encourage them to use the information provided by such a record analysis. The general purpose of this study is to examine the effect of adult farm management instruction on attitude change. Although it uses statistical analyses appropriate for psychological experiments, this study is not an experiment: it is a descriptive study.

There are three specific questions this study attempts to answer:

What is the effect of cumulative years of farm management instruction on attitudes toward farming and education? The study should produce a regression equation which would show how attitudes change with more years of instruction. By plotting the regression line it should be possible to visually compare its shape to a learning curve.

The second specific question is what relationship exists between attitudes and farm income? The answer to this question should help validate or disprove the assumption of a positive relationship between attitudes and higher income.

The final question asks the nature of instructor attitudes in relation to student attitudes. During several years of instruction, do students develop attitudes similar to those of their instructor? Do farm families drop out if their attitudes differ from their instructor?

The Significance of the Problem

The agriculture industry has the highest proportion of low income persons of any major industry in the United States (3). Three of every ten farm residents are poverty stricken (4). Only about three of ten farms in the nation gross more than $10,000 per year (5). Although these figures may not apply to Minnesota agriculture, there is clearly a contradiction between technological developments in agriculture and relatively small farm incomes. A recent study of farmers in farm management programs in Minnesota (2) reported average total farm sales of approximately $20,000 and labor earnings (income) of nearly $3,600 from farms with an average of $63,891 invested in fixed and working capital.

To profitably utilize technological developments in agriculture, farm families must learn entrepreneurial skills and attitudes different from those of the farmer walking the furrow behind his horse and plow. Financial success requires the modern farmer to assume risks and debt. He must have an interest in education and engage in more decision-making than did his father or grandfather. The degree these farmer characteristics result from farm management instruction has relevance far beyond the scope of individual instruction benefits.

Although the tools of economic analysis have been available to educators for a long time, it is only in relatively recent years that a few educators and economists have made serious attempts to establish theories in economics of education and to make some practical applications to current education problems. Education is an investment of resources. Empirically specifying the outcomes is the most arduous task when using the tools of economics in analyzing returns to investments in education. The most common measure is income, and few researchers have attempted to measure noneconomic returns.

If this study shows entrepreneurial attitudes result from instruction, there are many implications for other areas of education. Since not all sons of farmers can nor will become farmers, a need exists for counseling young men interested in production agriculture. Attitudes of financially successful farmers could provide a means of comparison for farm boys much as the Strong Interest Blank helps young people compare their interest profiles to people successful in each of several occupations.

Another important education implication is the effect of parental attitudes on rural student education aspirations. Other studies concluded that children from rural areas have lower aspirations than city counterparts, especially if their occupational goal is farming. Farm-raised boys entering occupations other than farming will be at a comparative disadvantage without some post-high school education. If adult education for farm families influences the degree to which capable rural youth seek higher education, the benefits of farm management instruction will accrue not only to the participants, but to society as a whole.

Yet another implication of this study is its relevance to studies of creativity. Hahn (6), in a review of research on creativity, summarized its importance this way:

> Creativity, perhaps more than any other human quality, is vital to the shaping of man's future. It seems apparent that a society, in order to insure its continued survival and growth, must provide a climate which permits the creative potential of individuals to emerge and develop. American industry, for instance, has rewarded the creative thoughts and products of individuals for many years, and, partly because of this, has grown into one of the strongest and most complex structures in the contemporary world.

Hahn's description is difficult to separate from entrepreneurship. One of the paramount issues in education is: who is training entrepreneurs? Where can students obtain instruction in the art and science of achieving an optimum mix of land, labor and capital for the purpose of profit-making?

This study is significant in several ways as a contribution to the general area of mental measurement in educational research. Few other studies have attempted to measure attitude change over a period as long as ten years. Most experiments in attitude change involve a pre-test, a treatment, and a post-test. This investigation differs because it employs what Campbell (7) calls the "after-only" design: all subjects respond at one point in time and comparisons are among groups rather than using repeated measures within groups to show differences. Sample size is related in part to the degree of confidence reasonable in evaluating the accuracy of the experiment, so the 500 farmers and their wives who responded in the study provide a reasonably sound basis from which to generalize. Perhaps the most important contribution this research makes to educational research is the availability of detailed income information for participating farm families which provides an empirical criterion for the attitude instrument.

CHAPTER II

REVIEW OF LITERATURE

Because this study relates to a diverse body of knowledge, it was necessary to review several subjects in the literature. The first section in this chapter is a review of studies in farm management. Economic returns to investments in education are a part of the study and so the second literature section is concerned with that kind of research. The last section of the review of literature deals with three areas of concern in attitude studies.

Human Factors Involved in Farm Management

Land, labor and capital have traditionally been the three variable factors in allocating resources in farming as in other enterprises concerned with production efficiency. Because efforts to measure variation in income and efficiency due to varying land, labor and capital have resulted in much unexplained variability, studying the goals and capabilities of the farm operator has become important. One problem in all attempts to measure managerial ability of farmers has been that performance was the only criterion studies have evaluated: none claimed they had directly measured managerial ability. It is logical to assume, however, a positive relationship between a farmer's ability and his performance (8).

Thomas suggested four categories of research related to measuring farm managerial ability (9).

1. Studies designed to isolate relationships between characteristics (personal, biographical, psychological) of farm operators, farm wives, and/or farm families and some measure of performance or "success" in farming.
2. Studies designed to develop instruments by which the probable performance or "success" of individuals in farming might be predicted.
3. Studies designed to treat management as an explicit variable in analyses of economic problems.
4. Studies designed to develop and test the validity of concepts about the nature of the management function, per se.

Most studies in the first category hypothesized that differences in characteristics of farmers, their wives and/or families could explain some portion of the variation in farming success. By interviewing farm families in 1932, Wilcox, Boss and Pond (10) related personal and family factors to net earnings. They found factors such as the wife's interest and help, ambition to succeed, interest in farming, technical knowledge and farm experience contributed to success in farming.

Westermarck (11) evaluated how several biographical, performance and personal attributes related to financial success in farming. He discovered that farmers with more education had higher incomes. In a study of Pennsylvania farmers, Hess and Miller (12) also found that schooling was a significant influence on performance.

By studying a sample of 207 farm managers in Southern Minnesota who had four years of records available, Lansford (13) was able to isolate some personal attributes of farmers related to earnings. He found that mental ability, two personal values, and personal experience were significantly related to earnings and that there was no interaction. Lansford suggested adding measures of beliefs, values and attitudes to his model to make the greatest gains in predictive ability.

Using the von Neumann Morgenstern method of calculating utility, Halter and Beringer (14) measured farmer cardinal utility functions. Farmers who had relatively high marginal utility per dollar of wealth specialized in more risky enterprises and were more likely to incur debt. Johnson (15) studied a similar farmer characteristic, risk preference, by asking farmers whether they preferred contracting to sell at a price lower than their expected price. He concluded farmers were generally risk-takers and were expected utility maximizers. A problem in both of these studies, however, was their hypothetical nature: researchers asked farmers what they would do if they faced a particular financial situation. The farmer's actual behavior could differ from the way he said he would react.

The second broad category of research efforts, developing and validating prediction instruments, was difficult to separate from the first research category because studies of the first type serve as bases. Although prediction instruments in industrial sectors of the economy are quite common, such is not the case in agriculture. There were, however, two representative types of efforts. Strauss (16) singled out four variables he felt measured the "orientation" component of decision-making: innovation proneness, rural life preference, primary group reference, and economic motivation. With these concepts in mind, he developed a rural attitude profile with statements about farmers which respondents were to rate as most or least like themselves. Goldsmith and others (17) criticized Straus' instrument because of its "forced choice" and for their impression that farmers reported the way they thought they should respond rather than how they really felt.

The other example of a prediction instrument measured probable performance level for prospective tenants on Indiana farms. Thomas, Blanchard, and McCormick (18, 19, 20) all worked on instruments to provide estimates of the "chances" a prospective tenant would be an "above average" or "below average" farm operator. Although these studies only indirectly attempted to measure managerial ability, they suggested the exciting possibility of being able to develop a similar test specifically for managerial ability.

The third research category related to a problem in virtually all economic analyses of agriculture problems: researchers have not been able to quantify management as an explicit variable. There have been a few attempts, however, by Pugh and MacEachern (21, 22) to use indices of tenant ability as explicit variables to estimate a series of production functions for Indiana farms. The results were not clear, but the method of analysis, using management as an explicit variable, has long been the agricultural economists' dream.

The fourth and final category of farm management research in human factors included struggles to conceptualize the nature of farm management and empirically verify these concepts. The Interstate Managerial Study (23, 24) was a comprehensive evaluation of midwestern farmer managerial processes. Individuals such as Johnson (25), Johnson and Haver (26) and others have also directed thoughts toward describing and measuring the whole management, decision-making process for farm families.

In any science, research results are more meaningful if they relate to a basic underlying theory. A major shortcoming of all research in the human factors in farm management was lack of an underlying theory of human behavior in decision-making processes. However, as Thomas (9) proposed, it was possible to sharpen efforts to identify and measure farm management by properly using existing concepts, knowledge and notions about the managerial process.

Economic Returns to Investment in Education

Alfred Marshall said the most valuable of all capital is that invested in human beings (27). With the arrival of Theodore Schultz's book, The Economic Value of an Education (28) the human capital concept achieved new importance to theories and studies of investment in education. Mary Bowman's statement of the human capital concept is particularly concise:

> In an investment orientation to education we are concerned above all with the relations between the resources utilized to form human competencies (resource costs of education-whether in school, on the job, or elsewhere) and increments to productivity that result (29).

Education, like industry, cannot optimize a flow of output without changes in the organization and employment of human effort (30). Given the constraint of limited resources and given the tools of economic rationale, educators must invest in the parts of the education process which will optimize the output.

Although the purpose of both education systems and industries is to produce an output by utilizing various resources, there are several ways education systems are different. For most industries, in contrast to education, market transactions determine output and input quantities and prices. Under the assumption of competition, if supply exceeds demand, the price of the product drops. Political considerations influence education resource allocations more than do market situations. Even though there is no well-defined education market, given the fixed amount of resources which political bodies appropriate, education policymakers should have the technical knowledge available to maximize production in accordance with public goals for education.

In response to the demand for economic analyses of the education process, many economists have studied returns to education investments: Theodore Schultz (28), Gary Becker (31), John Vaizey (32), and Hector Correa (33) are only a few representative names. There have been few research efforts at the microeconomic level, however, and even fewer dealing with the investment effects of farm management instruction.

Rolloff (34) analyzed the relationship between Ohio farm management education and economic efficiency in terms of income. He used farm income after the first year of instruction as a basis for comparison, assuming the first year contributed nothing to efficiency. After accounting for input costs of $5 per unit instructional hour, Rolloff reported a $53.16 return for each dollar invested.

Rolloff's benefit-cost analysis,failed to account, however, for all the program costs. Operating and capital costs constitute a principle proportion of the education outlay. Opportunity costs for the individual farm family and society, while difficult to estimate, are significant cost factors in policy decisions concerning alternative investments. Rolloff's model was an early effort to determine the economic benefits of farm management instruction.

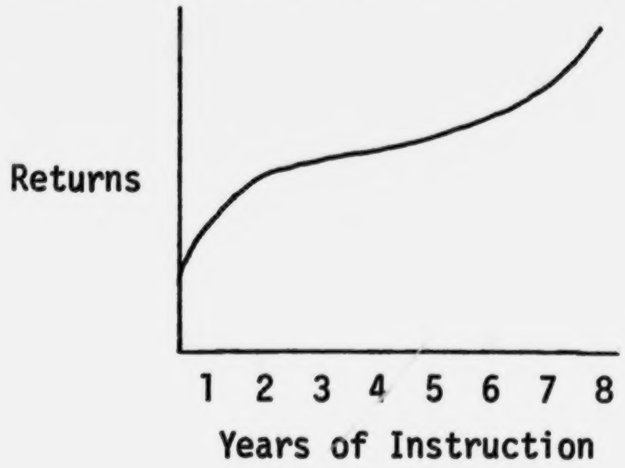
The first study at Minnesota which dealt with economic investments in education for farmers was Cvancara's (1) 1964 investigation of input-output relationships for 33 farmers who participated in the adult farm management program. He used a matched control group of 33 farmers who had no farm management education. His results showed a definite advantage to the management program participants, but suggested the possibility of a diminishing returns effect after the second year of management instruction.

The next systematic effort to measure economic returns to an educational input for farmers was the 1966 Persons-Swanson (35) study of farmers who participated in the Minnesota institutional on-farm training program following World War II under Public Laws 346 and 16. They found that the number of vocational agriculture classes attended was a significant predictor of gross income. The other significant variables were: 1) age at beginning of vocational training in farming, 2) beginning tenure status, 3) total beginning capital, and 4) Mechanical Aptitude Test score.

Most recently, Persons, Swanson, Kittleson and Leske (2) conducted a detailed study of the investment effects of education in agriculture. The subjects of the study were farmers who had enrolled in adult farm business management in vocational agriculture departments of Minnesota public schools for time periods ranging from one to fourteen years. The unit of analysis was the year-end summary and analysis of the Minnesota Farm Account Book, or a similar record book, which was the basis for farmer decision-making. There were 3,518 farm record analyses including the years 1959 through 1965.

Because of natural and economic influences on farm income such as weather, general economy of the country and price levels, there was a need to compensate for those factors which were not attributable to education. The authors devised an index system in which they assigned an index value of 100 to the average income of farm families who had kept one year's record in a particular year. Within that same year, the incomes of farmers who had kept records two, three or subsequent years were assigned an index value relative to the performance of the group analyzing a record for the first time.

One major result of the study was a set of performance curves which reflected the relationship between indexed economic returns and education inputs. By using the statistical technique of curvilinear regression, general forms of the performance curve resulted similar to the one in the following figure:



The shape of the performance curve showed a rising rate of return to education inputs during the first three years, a decreasing rate during the fourth and fifth years, and a return increasing at an accelerating rate during the sixth or seventh year of instruction. The authors explained the curve by suggesting that an increase in the rate of return during the first three years may have been a result of modern technologies which were relatively easy to assimilate into the existing farm operation. During the fourth and fifth years the farmer may have responded to instruction by reorganizing his business. The increasing rate of return in the sixth and subsequent years was a response to the more profitable reorganization of the farm resources: a more effective use of entrepreneurial skill.

The cries of protest that arise in education circles when there is mention of an economic study of education show that many people are unwilling to evaluate education without due consideration of the sociological changes that are an integral component of the education process. Admittedly, this is a serious shortcoming of attempts to measure education payoffs. Even if it is not possible to accurately assign a monetary value to a non-dollar type of education returns, there is a need to at least identify the nature and magnitude of the non-economic returns.

Attitude Studies

Although researchers in agriculture education have done little in the field of attitude change and attitude scale development, attitudes and scaling have been a concern in other areas of education, particularly in psychology and sociology. A necessary preliminary to any discussion of relevant literature is to define what the word attitude means. One of the first psychologists to attempt measuring attitudes preferred the simple definition of an attitude as a disposition toward overt action (36). Others have said an attitude is a "relatively stable affective response to an object" (37), or a "way of being 'set' toward or against certain things" (38), or a "tendency or disposition to evaluate an object or the symbol of that object in a certain way" (39).

Most attitude definitions contain common general concepts, and Anastasi's (40) statement most clearly expresses the meaning of attitudes in this study: "An attitude is the tendency to react in a certain way toward a designated class of stimuli". Attitudes may not be directly observable, but it is possible to infer attitudes from overt behavior-verbal and/or non-verbal. Even overt behavior may not demonstrate the true attitude, as in a situation where a person has to behave in a socially acceptable way even though his true feelings conflict with his behavior.

Methods of Scaling:

One of the first well-known methods of attitude scaling was Thurstone's (41) procedure which he developed in 1929. He proposed the following steps to establish his equal-appearing interval scale:

1. Have a large group submit many various opinions about some topic.

2. Have a large group of judges divide these statements into about 11 categories which appeared to have equal distances between them ranging from those very favorable toward the concept to those very unfavorable.

3. Reject those items on the list which were ambiguous and/or irrelevant.

4. Select statements from those remaining which were about equally spaced along the psychological continuum marked by item scale values determined by median responses of the judging group.

5. Administer the scale to subjects and measure attitudes by adding the scale values of those statements which they agreed with.

Authorities have criticized Thurstone's method for the difficulty and time involved in its development. Others have claimed testing equality of distances between items is difficult, if not impossible (42). What is more, there was a lack of independence between the judging group's attitudes from which the scale values were originally determined and their placement of statements into categories with equal appearing intervals.

Another major scaling method came from Likert's efforts to use item analysis or some other measure of internal consistency to detect which items discriminated between people who were at the opposite extreme of some measurable attitude. In this scaling method, there was no need for a group of judges to establish equal-appearing intervals. Subjects made responses to positively and negatively worded statements on a continuum which had as extremes strongly agree and strongly disagree. Some have called Likert's method summated ratings because added attitude item scores determine individual positions on each attitude scale.

Several scaling methods are more current such as those of Guttman (43), Sherif (44), Lazarsfeld (45), and Osgood (46). Osgood's semantic differential represented a quite different approach to attitude scaling. He used a set of verbal dichotomies such as good-bad and hot-cold and studied the response patterns related to some concept or statement.

In general, the other three scaling techniques are quite similar in the methods of item response analysis. Guttman and Lazarsfeld techniques attempted to determine whether there was unidimensionality in the underlying psychological scale. In other words, they wanted to feel confident the scale measured only one attitude. Theirs was a valuable attempt, but Likert scale responses are amenable to unidimensional techniques and possess the advantages of high reliability (42), ease of development, ease and speed of administration and the adaptability to computer analysis.

Theories of Attitude Change

As in research efforts in other sciences, studies of attitude changes without supporting theories would lack direction and logical consistency. Insko (47) has collected a compendium of experimental approaches to attitude change. He included two theories which could provide theoretical support to this study. The first one, by Hovland, Janis and Kelley (48), drew upon reinforcement learning theories. They proposed persuasive communication as the principle of attitude change. Two distinct responses make up the communication:

first the individual thinks of his own answer to a question and then he thinks of the answer which the communication suggested. Merely learning the conclusion which the communication suggested would not result in attitude change: attitude change depends on incentives which the communication offers. These incentives may be arguments supporting the conclusion or expected rewards or punishments that might follow upon accepting the new attitude.

As Insko suggested, one of reinforcement theory's weak points was the failure to state connotatively rather than just denotatively what was a reinforcing stimulus. He also criticized the theory because the relationships among concepts were not clearly worked out. Insko concluded that while reinforcement theory has and is serving as a framework for other related theories of importance such as attention, comprehension and acceptance, it has enough serious shortcomings so that it is not a predominant theory of attitude change.

The other major theory of attitude change which is related to this study is one by Rosenberg and Abelson (49). These authors suggested attitude change is a result of resolving imbalance between what they call "cognitive relations". For example, if a farmer wants to make more profits, likes to milk cows, but learns that milking cows is an unprofitable enterprise, he will have to change one of the three relations. Abelson (50) proposed four modes of resolving imbalances: denial, bolstering, differentiation and transcendence. Denial involves altering one or more of the cognitive relations, much as the farmer would do by deciding he disliked milking cows. Bolstering involves cancelling inconsistent cognitive relations by adding other consistent relations. This process is similar to Festinger's cognitive dissonance theory. Returning to the farmer for an example, he might tell himself that milking cows is economically conservative (little risk), provides work in the winter time, and is a source of personal satisfaction. Differentiation for the farmer would be his redefining what "making more profit" meant so that he had less aspiration for maximum profit. The example of transcendence which Insko reported was combining inconsistent cognitive relations into larger subordinate elements.

Insko claimed the Rosenberg and Abelson consistency theory had one major shortcoming: it failed to account for varying strengths of cognitive relations. Although many aspects of the theory remained untested, Insko felt related research was highly consistent and supportive.

Attitude Studies

Several studies of behavioral antecedents related to farm management have included attitudes as well as goals and values. In their review of literature, Hobbs and Warrack (51) divided research of goals, values and attitudes in farm management into two broad categories: 1) those predictive studies which used the three behavioral antecedents as independent variables and performance as the criterion; and 2) those predictive studies which attempted to employ criteria which were means to performance -- not performance itself. Because this study proposes to cover both categories, it is relevant to discuss related literature in each.

Few predictive studies in farm management have claimed to research the relationship between attitudes and performance. One study especially relevant was that of Hobbs, Beal and Bohlen (52) at Iowa State. They analyzed the relation of farm operator values and attitudes to economic performance of 131 farmers. They used basically the Thurstone technique in developing five value scales (see page 16). Likert type items, however, constituted the resulting scales which farmers responded to with seven choices from strongly agree through strongly disagree. The coefficients of correlation between farm income and five value scale scores were: .222 for economic motivation, .171 for scientific orientation, .113 for mental activity, .371 for the independence scale, and .267 for the risk aversion scale. The coefficient of multiple correlation was .436 which accounted for 19 per cent of the variation in farm income.

Goals and values are often difficult to separate from attitudes. For example, some of the measures in various research efforts were risk-aversion, decision-making autonomy, economic motivation and independence. Assuming only a fine line separates goals, values and attitudes, the Hobbs and Warrack conclusion concerning their extensive review of these predictive studies is relevant and concise. They reported that all of the research was exploratory and inconclusive. The other major criticism was the lack of a control group; most samples used persons who were members of some record-keeping or management association.

Other predictive studies of behavioral antecedents in farm management have as criteria means such as use of credit, adoption of farm practices and involvement in education activities. Hoffer and Stangland (53) used efficiency, willingness to take risks,progress, security and conservatism. Ramsey and others (54) also studied innovativeness and found traditionalism negatively related to the adoption process.

Fliegel (55) studied low income farmers and discovered higher income farmers had more favorable attitudes toward credit. Likewise, Hesser and Janssen (56) measured attitude toward credit and found scale scores contributed significantly to explaining the variance in amount of farm credit use.

One attitude study particularly relevant to this paper was one by Teske (57) in 1958 at the University of Minnesota. He used the Likert method of scaling and a chi-square procedure for determining which items to discard and how to score the responses. Teske's study involved attitudes toward the value of college training in agriculture for farming. After giving a list of items to two validating groups, his final inventory contained 58 items discriminating between the .001 and .05 levels. He went on to study attitudes of farm operators, high school vocational agriculture instructors, county agriculture extension agents and public high school counselors. The farm operators were the only subjects who, on the average, had a relatively negative attitude toward college training in agriculture as preparation for farming.

SUMMARY

Studies in farm management, especially those dealing with non-economic measures, have used relatively small samples, used only correlation methods and were not attempts to measure attitude change. The basic criticism of most studies of returns to investments in education is their failure to account for non-economic benefits such as changes in attitudes. Certainly if one of the goals in education systems is to produce students with desirable attitudes, goals, and values, then evaluation research ought to include these sociological returns as measures of benefits.

The few attitude studies in agriculture have had uniformly small samples and have usually included only subjects who were members of some management association. Very few efforts have attempted to measure attitude change using the criterion of detailed farm income to determine the relationship between attitude and income change.

Other studies have investigated human factors in farm management, or economic returns to investments in education, or attitudes. The problem and challenge remained, however, to combine all three areas of inquiry in order to answer this question: does farm management instruction affect attitude changes which relate to the changes in entrepreneurial skill which income measures?

CHAPTER III

DESIGN OF THE STUDY

Nature of the Design

The most popular experimental design in attempts to measure attitude change has been the before-after design. Ordinarily one experimental group receives a pretest, a treatment, and then a post-test. At the same time one control group receives the pretest and post-test without the treatment. The main problem with this experimental design is the possible interaction between the pretest and the experimental manipulation. The pretest in attitude change studies may reinforce the subjects' initial position to make experimental communications less effective or the pretest might make subjects more aware of the issues so that the communication is more effective.

Campbell (7) has recommended an alternative experimental design, which this study employs. His suggestion was a "post-test-only control group design", or in other words an after-only design. One group gets the experimental treatment and then the post-test; the other group gets only the post-test. This design does not permit a pretest interaction and requires less cooperation from the subjects.

Rather than measuring attitudes before farm management instruction and again after instruction, this study measures attitudes at one point in time. Some subjects have been in farm management classes one year, some for two years and others in subsequent years through a ten-or-more category. Another group of farmers had dropped out after receiving some instruction. The control group had never been in a farm management education program. The fourth group of subjects were vocational agriculture instructors who conducted the farm management programs.

Development of the Instrument

Because there was no paper and pencil test available for measuring farm family attitudes toward education and farming, it was necessary to devise one. The first step was to select a procedure for scaling. After an extensive review of literature, the Likert type of scaling appeared to be the most desirable for its high reliability, ease of development, ease and speed of administration and adaptability to computer analysis.

The next step in the procedure was to compile a list of positive and negative statements about several aspects of education and farming. Some statements came from other studies, some from editorials and farm magazines and some from textbooks, but many originated simply because of their relation to the attitudes under study. The scales included statements with five response alternatives: Strongly agree, Agree, Undecided, Disagree, and Strongly disagree. The tentative list included approximately 300 statements.

The list was administered to a saml1 group of 14 people in order to accumulate data necessary to compute item discriminations and to reduce the number of statements to a manageable size. Seven farm families (14 people) in a farm management program in south central Minnesota responded to the initial list of items and made comments on items they judged unclear or ambiguous. Item analysis using the seven highest total scores versus the lowest scores provided a discrimination index for each item. Items which both halves answered about the same were eliminated. The final list had 90 items: 41 measuring education attitudes and 49 for farming attitudes.

There were two versions of the instrument. The only differences were that the instruments for husbands were printed on blue paper and labeled husband version as compared to the wife version printed on pink paper.

The item response weights were assigned by the procedure of reciprocal averages which is described in the statistical analysis section of this study.

The test-retest reliability was estimated by presenting the questionnaire a second time to 75 farm families and calculating the correlation between total scores of the 61 respondents.

Population and the Sample

Vocational agriculture departments in Minnesota public secondary and area vocational-technical schools offer farm management education programs for adults. All farm management instructors are certified teachers, but not all of them have full-time responsibilities for adult education. Although about 70 schools employ at least one full-time instructor, there are many others which assign a limited adult education responsibility to the high school vocational agriculture teacher.

Full-time adult instructors may enroll between forty and sixty farm families in the local program. In most schools, instruction is done in the classroom and through individualized on-farm-instruction. Classroom topics for the first year center around learning how to keep an accurate and complete farm record and how to use it in decision-making. Farm families in the second year of classroom instruction study their business through a business analysis and learn about the application of economic principles as one of the means of meeting farm and family goals. The third and subsequent years often involve a thorough study of farm business organization. There are many farm families who have enrolled for ten or more years.

There were four main groups of people in this study. One group was farm families who submitted records for analysis in the 1967 Minnesota Farm Management Program. Some farmers had been enrolled for over ten years. To control sample size, a random sample of families within each category (defined as number of years in which families analyzed their farm record) provided the subjects for study. In some cases, especially in the eighth, ninth and ten-or-more years of participation categories, small n's required that all families in those categories be subjects.

The second group was farm families who had dropped out of the Minnesota Farm Management Program in 1964, 1965, or 1966, after having submitted varying numbers of records for analysis. Some dropped after the first year, some after the second, and after subsequent years: there were even a few who dropped after ten or more years. In cases where the subgroups were large enough, random selection procedures provided the subjects for study; in other cases all farm families in a subgroup appeared in the sample.

The third group of farm families served as a control group in that they had never submitted records for analysis in a Minnesota farm management program. The names of approximately 20 farm families selected at random came from each of ten randomly chosen Minnesota County Agriculture Stabilization and Conservation Service (ASC) offices.

Table 1

THE SAMPLING PLAN OF FARM FAMILIES

	Years of Participation											
	0	1	2	3	4	5	6	7	8	9	10+	
Farm Families Currently Enrolled		60	60	60	60	55	45	34	29	23	57	483
Farm Families Who Dropped Out		30	30	30	30	21	4	8	5	8	13	179
ASC Farmers No Instruction	200											200

To illustrate the sampling plan, Table 1 shows the number of farm families in each category. Not all of those selected to receive a set of questionnaires responded.

Besides farm families chosen for the mail questionnaire study, there was a group randomly chosen for personal interviews from the families currently enrolled. The interview served as one measure of validity. Responses from the group interviewed should have been more accurate estimates of attitudes than the responses from groups with whom only printed communication was possible.

The fourth group for study was the agriculture instructors responsible for adult farm management education programs in which the farm families were enrolled.

Collecting the Data

On December 28, 1968, all subjects in the three farm family target populations, except those who were to receive a personal interview, received husband and wife versions of the farm family opinion inventory*. The letter going to potential interviewees included a post card on which families could express willingness to cooperate and could mark days agreeable as interview dates. The vocational agriculture instructors received only the husband version of the instrument.

Follow-up post cards on January 10 were the first reminder to farm families and agriculture instructors receiving questionnaires.

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* See the appendix for copies of the cover letters.

The January 27 follow-up was another cover letter and set of questionnaires for those who had yet to respond to either of the other two mailings.

Because of weather conditions and time limitations, not all farmers in the personal interview category could be reached for an interview. A mailing of cover letters and questionnaires went to those who could not be interviewed on February 12. There was also a post card reminder on February 21.

Selected farm families responded in personal interviews between January 20, 1969 and February 7, 1969. Besides receiving two questionnaires, the family had an opportunity to answer general and specific questions about education and farming. So that experimenter bias could be at a minimum, the families were instructed to wait from four days to a week before completing the questionnaires.*

Another study of farm management in Minnesota (2) provided the economic and descriptive farm business data for fulfilling the second objective of this study: to measure the relationship between attitudes and income.

Method of Statistical Analysis

Cluster Analysis

Before attempting to answer the three questions basic to this study, the first step was to determine the number and nature of the underlying dimensions and then to estimate individual scores representing each dimension. Cluster analysis (58) was a useful statistical tool for placing items on the questionnaire into groups called clusters which generally measured the same dimension. A matrix of intercorrelations was the initial input for each of the two attitude scales: education and farming. The two items within each scale which correlated highest were chosen as the first two members of the first cluster. The next highest correlated variables were added until the ratio of average intercorrelations within a cluster to their average correlation with variables not included in the cluster (a B-coefficient) was less than 2.50.

The cluster analysis provided four major groups of items within each of the two scales for a total of eight subscales. The process of labeling each cluster was to provide a logical name that would represent what each cluster of items seemed to measure. The interrelations are to be considered hypotheses verifiable by further investigations.

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* A summary of interview results is in the Appendix.

Method of Reciprocal Averages

The method of reciprocal averages provided a set of weights for responses to each item in the questionnaire. The initial weights for each item were 5 for strongly agree, 4 for agree, 3 for undecided, 2 for disagree and 1 for strongly disagree. The new weights varied from item to item and were assigned so they would maximize the internal consistency of each of the two scales: education and farming.

There were two assumptions which enabled using the instrument as if it had interval scale properties. First it was assumed that individuals with higher scores would assume a higher position on an underlying performance continuum, which some call a latent continuum. This assumption allowed measurement at the ordinal level. To make inferences about the magnitude of differences between points on the continuum, equal units on the continuum are necessary. Assuming a normal distribution on the continuum doesn't help in assuming a zero point and hence ratio scale properties, but if there is a normal distribution for obtained scores, it is legitimate to express the individual positions as being on an interval scale: equal distances on which the normal distribution is placed are also equal units (59).

Mosier (60) listed six desirable properties of the final scale which the method provides:

1. The reliability of each item and the internal consistency of the weighted inventory are maximized.

2. The correlation between item and total score is maximized.

3. The relative variance of the distribution of scores (coefficient of variation) is maximized.

4. The relative variance of item scores within a single case is minimized.

5. The correlation between an item and total score is proportional to the standard deviation of the item weight for that item.

6. Questions which bear no relation to the total score variable are automatically weighted so that they exert no effect on the scoring.

The best way to explain the method is to work through the first steps of a simple problem. Table 2 illustrates a sample procedure which includes five individuals, five items, and five possible responses. By using the initial item weights of 0, 1, 2, 3, and 4 for item responses, it is possible to compute the individual total scores (Table 2a).

Table 2

A SAMPLE RECIPROCAL AVERAGES PROCEDURE

Table 2a

Individual	Items 1	2	3	4	5	Sum of the responses	Individual Total Scores
1	1	1	1	1	1	5	0
2	2	1	2	1	2	8	3
3	3	2	3	2	3	13	8
4	4	3	4	3	4	18	13
5	5	4	5	4	5	23	18

Initial Item Response Weighting:
Response 1 = 0
2 = 1
3 = 2
4 = 3
5 = 4

The column of primary interest in Table 2b is the mean item response scores. The sum of individual total scores for all persons responding to a particular item with the response in question divided by the number of individuals responding in that way yield an average score for each item and response. The range of mean item responses provides an upper and lower boundary for the distribution in Table 2c. In the example the range of individual scores is 0.0 to 18.0 so the width of each interval is 3.6 because there are five weights to assign.

Table 2b

Item	Response Category	Frequency	Initial Weight	Mean Item Response Score	New Weights	Absolute Change in Weights
1	1	1	0	0.0	1	1
	2	1	1	3.0	1	0
	3	1	2	8.0	3	1
	4	1	3	13.0	4	1
	5	1	4	18.0	5	1
2	1	2	0	1.5	1	1
	2	1	1	8.0	3	2
	3	1	2	13.0	4	2
	4	1	3	18.0	5	2
	5	0	4	0.0	1	3
3	1	1	0	0.0	1	1
	2	1	1	3.0	1	0
	3	1	2	8.0	3	1
	4	1	3	13.0	4	1
	5	1	4	18.0	5	1
4	1	2	0	1.5	1	1
	2	1	1	8.0	3	2
	3	1	2	13.0	4	2
	4	1	3	18.0	5	2
	5	0	4	0.0	1	3
5	1	1	0	0.0	1	1
	2	1	1	3.0	1	0
	3	1	2	8.0	3	1
	4	1	3	13.0	4	1
	5	1	4	18.0	5	1
						$\Sigma=32$

Table 2c

Mean Item Response Class	Weight to be Assigned
0.0> - ≤ 3.6	1
3.6> - ≤ 7.2	2
7.2> - ≤10.8	3
10.8> - ≤14.4	4
14.4> - ≤18.0	5

Range of mean item responses: 0.0 - 18.0
5 weights, so interval width of distribution
for mean item responses is: $\begin{array}{r} 3.6 \\ 5\overline{)18.0} \end{array}$

Table 2c includes the distribution of mean item responses and reveals how the integer weights will be allocated to item response categories. These new weights appear in Table 2b and Table 2d shows the new individual total scores.

Table 2d

New Individual Total Scores

Individual	Total Scores
1	5
2	5
3	15
4	20
5	25

This procedure continues until the sum of the absolute changes in item weights (in this case Table 2b shows the sum to be 32) reaches some minimum value. If the individuals, items, and response alternatives are few, then zero is a feasible maximum value. A rule of thumb as to degree or precision is to perform successive iterations until the sum of absolute changes in weights is approximately 1/10 of a point change per item.

Curvilinear Regression and Correlation

Once cluster analysis had provided a means of dividing the items into subscales of education and farming attitudes and then the reciprocal averages procedure had provided individual scores for each subscale, the next step was to use curvilinear regression to answer the first basic question of the study: what is the nature of the relationship between attitudes and years of farm management instruction? For a detailed explanation of the curvilinear regression method, Hays (61) and Draper and Smith (62) provide mathematical derivations and complete explanations of necessary assumptions. In sum, curvilinear regression is a technique for determining the shape of a line through points and for estimating its accuracy. The least squares method is the most common procedure for minimizing the variance of observations not on the regression line. If the observations are not scattered and are close to the predicted line,the variance is small and ability to account for the variation is relatively good.

The second major question of the study asked the relationship between attitudes and income. Attitudes were labeled the dependent variable and income was used as an independent variable in a multiple regression model. Draper and Smith (62) provide an intricate discussion of multiple regression in their book. In general, least squares was again the statistical tool for finding constant values in a regression equation which gave the best prediction since the average squared error would be at a minimum. There was also a measure of accuracy in multiple regression, the squared multiple correlation coefficient which indicated the proportion of the accountable variance in the dependent variable.

The third and final central question of the study asked the relationship between instructor and student attitudes. The hypothesis was that farm families who had been in farm management programs for more years would have attitudes more like their instructors. Although linear correlation was a relatively weak statistical technique as a predictive tool, it served as a descriptive method for suggesting covarying relationships. Most elementary statistics textbooks include both the formula for calculating the Pearson product-moment correlation coefficient and a description of its uses and shortcomings. (63, 64)

Factor Analysis

Another way to determine which groups of items within each scale measured a common factor was to use the statistical technique of factor analysis. Whereas cluster analysis assigned whole items to subscales, factor analysis determined the variance an item contributed to each of several subscales or factors. The first procedure was to compute a complete intercorrelation matrix for all the item responses within each of the two attitude scales: education and farming. The method of principal component factoring was then applied to the education and farming scales with ones' in the diagonal of the intercorrelation matrix (65). All factors were kept which had roots greater than 1.00. This procedure produced 10 factors in the education scale and 16 factors in the farming scale. The varimax rotation procedure as suggested by Kaiser (66) was the next part of the factor analysis procedure.

By inspecting the proportion of the variance accounted for in the varimax solution, it was possible to select three factors for the farming scale and three for the education scale. The total proportion of variance for the three education factors was .246 with .074 being the smallest proportion accounted for by one factor. For the farming scale the total proportion of variance accounted for by the three factors was .142 with .035 being the smallest proportion accounted for by one factor.

Items within each factor for each of the two attitude scales were selected to provide subscale individual scores which would be estimates of the underlying dimensions of education or farming attitudes. Items in each factor were included which had factor loadings with approximate absolute values of .30 as a minimum. There were no overlapping items in the education subscales and only two overlapping items in the farming subscales, so the items were reasonably unique.

With the aid of electronic data processing equipment, the statistical procedures provided the basis for the results in the next chapter.

CHAPTER IV

RESULTS OF THE STUDY

Sample Characteristics

Before answering the three specific questions central to this study, it is first important to report the sample characteristics which show the nature of the farm families and their responsiveness. Table 3 reports the proportions of the various groups who responded to the mail questionnaires.

Table 3

FREQUENCIES AND PROPORTIONS OF RESPONSES WITHIN EACH GROUP[a]

Group	Number of Responses	Non-Respondents	Total	Per cent Response
Farm Management:				
Participants	239	77	316	76%
Interviewees[b]	93	47	140	66%
Farm Management: Dropouts	110	59	169	65%
ASC Farm Families	91	79	170	54%
Agriculture Instructors	63	6	69	91%
Total	596	268	864	69%

[a] A response is a questionnaire from a husband, wife, or both.

[b] Of the total interviewee sample, 35 received a personal interview.

The response pattern is not different from expectations. The highest proportion of responses was from farm families who were still in farm management education programs. Farm families who had at one time participated in a management program also responded in a relatively high proportion. Approximately half the farm families with no farm management education responded and only six agriculture instructors failed to respond. The overall proportion of response was 69 per cent.

Table 4 shows there was little difference among the three major groups of farm families. For purposes of descriptive comparison, participants and dropouts with farm management training were combined to represent farm families with some exposure to special instruction. On the average, those farm families who had some farm management training were younger, more educated, and members of more organizations. There was very little difference, however, between the education and farming attitude scores for the two groups of farm families. When measuring the possible effects of instruction, it is important to consider not only the averages, but also an estimate of variation. The families with farm management training had considerably greater standard deviations on both attitude scales. The vocational agriculture instructors were younger, members of more organizations, and had more positive attitudes toward education than the farm family groups.

Often a visual representation of samples provides a means of evaluating similarities and differences between two distributions. Figure 1 illustrates the general similarity in age between the two distributions. There are no farm management families in the oldest category. Although the ASC family age distribution is flatter with more respondents at younger and older ages it is generally the same shape as the farm management age distribution.

Another variable with which to compare the farm management and ASC groups is years of education. Both distributions are bimodal at eight and twelve years of education. Figure 2 reveals how both groups are similar in that most farm people had either eight or twelve years of education. There are several farm management families with more than a high school education, but in most cases, it is probably the wife who contributed to the higher level of education.

A third way to inspect the two groups is to compare the distributions of membership in organizations. Although the shapes of the two distributions are quite similar, Figure 3 portrays the farm management group as having an average of 3.7 memberships in organizations. The ASC farm families appear more homogeneous as a group since the standard deviation of their membership in organizations is 1.6 compared to 2.2 for the farm management families.

Table 4

DESCRIPTIVE SUMMARY STATISTICS OF THREE MAJOR GROUPS

Variable	Number of Observations[a]	Mean	Standard Deviation
Farm Management Group (including all respondents: dropouts and participants: husbands and wives)			
Years of Instruction	820	4.86	2.82
Age	786	41.27	9.11
Years of Education	787	11.78	2.16
Number of Children	777	3.82	2.08
Number of Organizations	699	3.75	2.19
Education Attitude Score	828	123.12	7.45
Farming Attitude Score	828	151.26	10.53
ASC Farm Families (including all respondents: husbands and wives)			
Age	155	45.26	13.0
Years of Education	155	10.73	2.62
Number of Children	149	3.31	1.90
Number of Organizations	121	2.91	1.57
Education Attitude Score	167	122.28	5.70
Farming Attitude Score	167	151.77	6.59
Vocational Agriculture Instructors			
Age	63	39.88	9.40
Years of Education	58	16.45	1.79
Number of Children	55	3.16	1.70
Number of Organizations	50	5.10	3.28
Education Attitude Score	63	127.89	5.88
Farming Attitude Score	63	152.03	5.95

[a] Total number of families in farm management who submitted records for analysis in 1967: 1436.

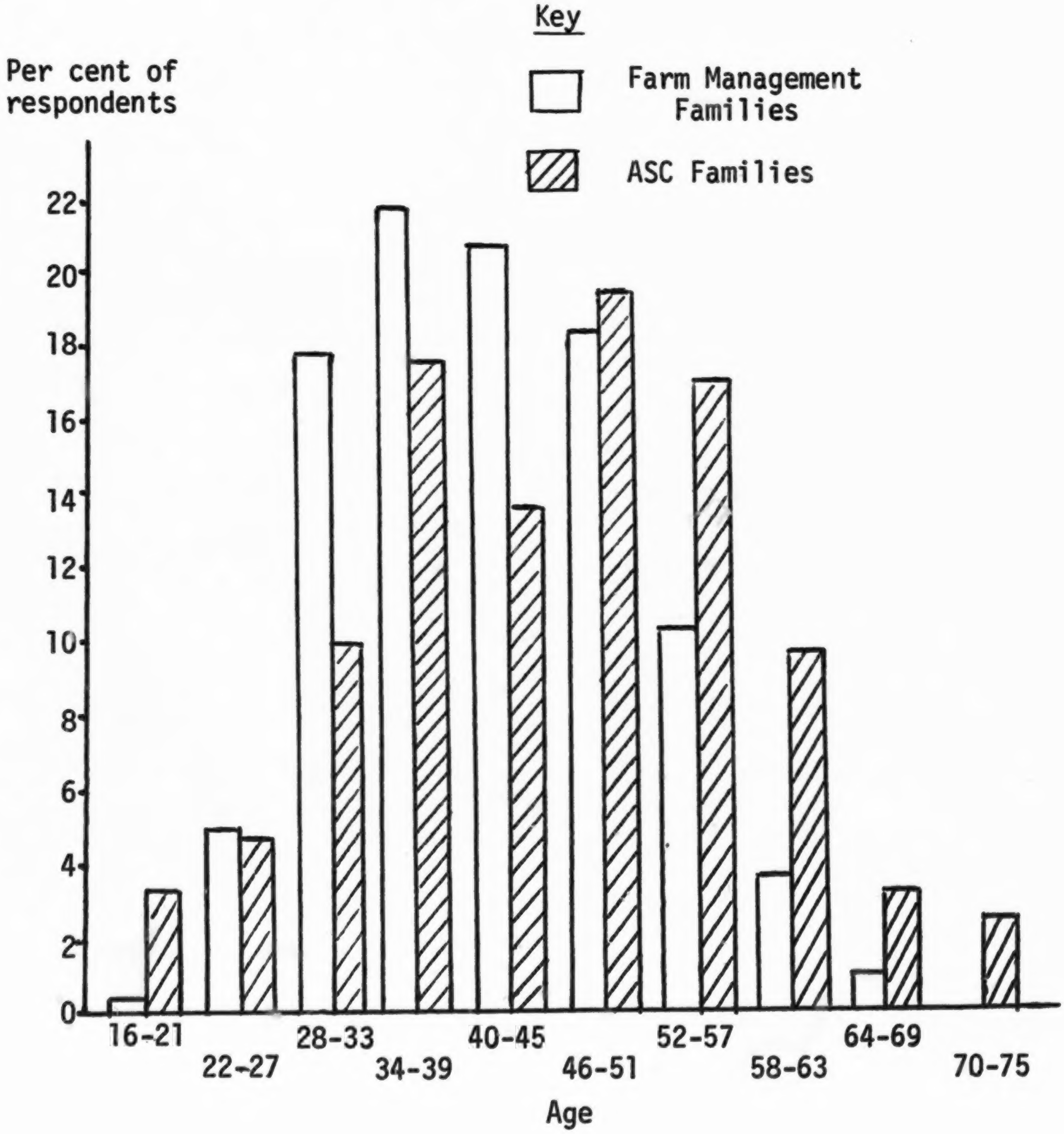

Figure 1. THE AGE DISTRIBUTION OF THE FARM MANAGEMENT AND ASC FARM FAMILIES[a].

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[a] Mean ASC age: 45, standard deviation: 11.6
Mean FM age: 41, standard deviation: 9.1
Farm Management Families includes both participants and dropouts.

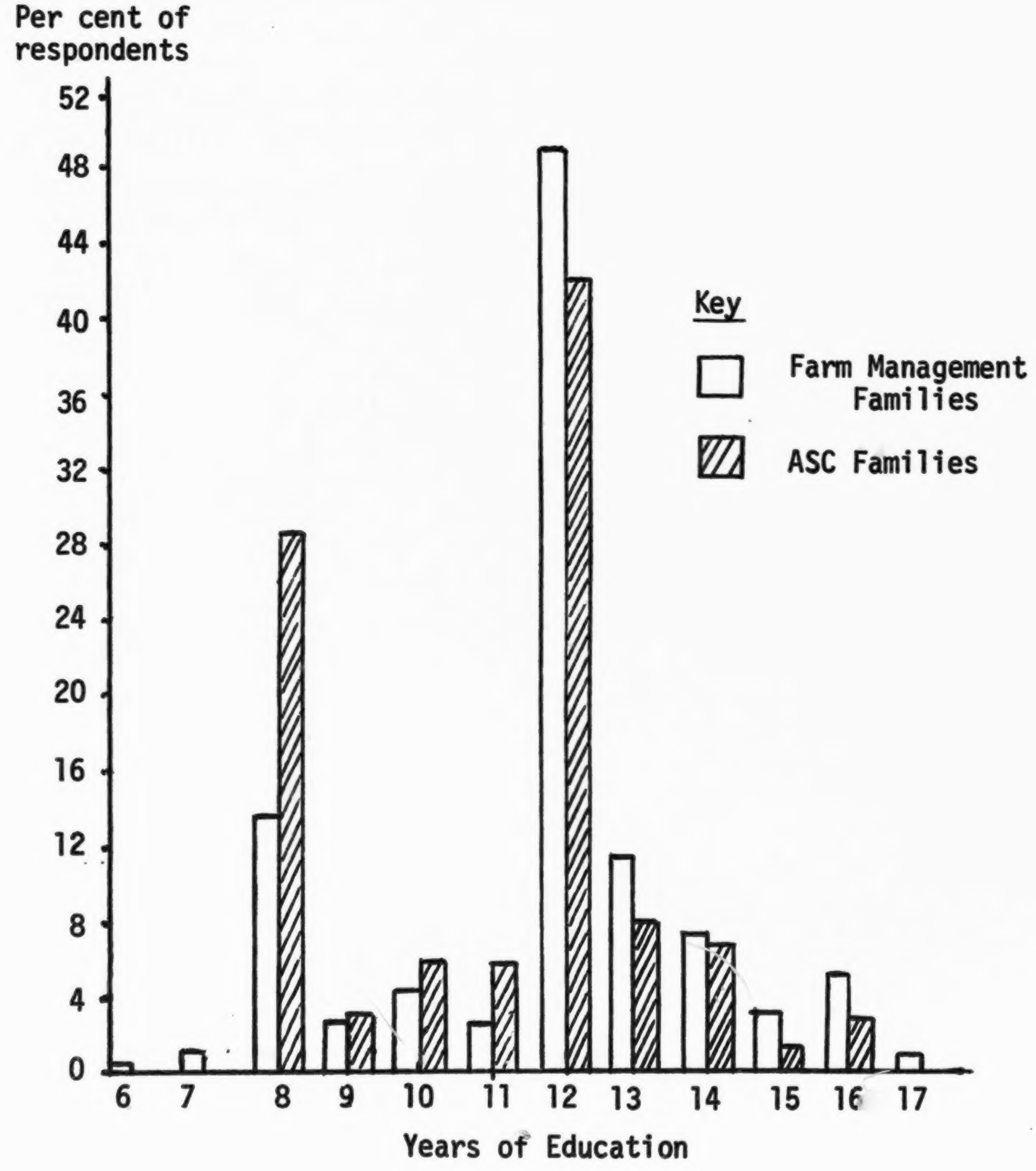

Figure 2. THE EDUCATION DISTRIBUTION OF THE FARM MANAGEMENT AND ASC FARM FAMILIES[a]

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[a] Mean ASC education: 10 years, standard deviation 2.6
Mean FM education: 12 years, standard deviation 2.2
(3 people had more than 17 years of education)
Farm Management Families includes both participants and dropouts.

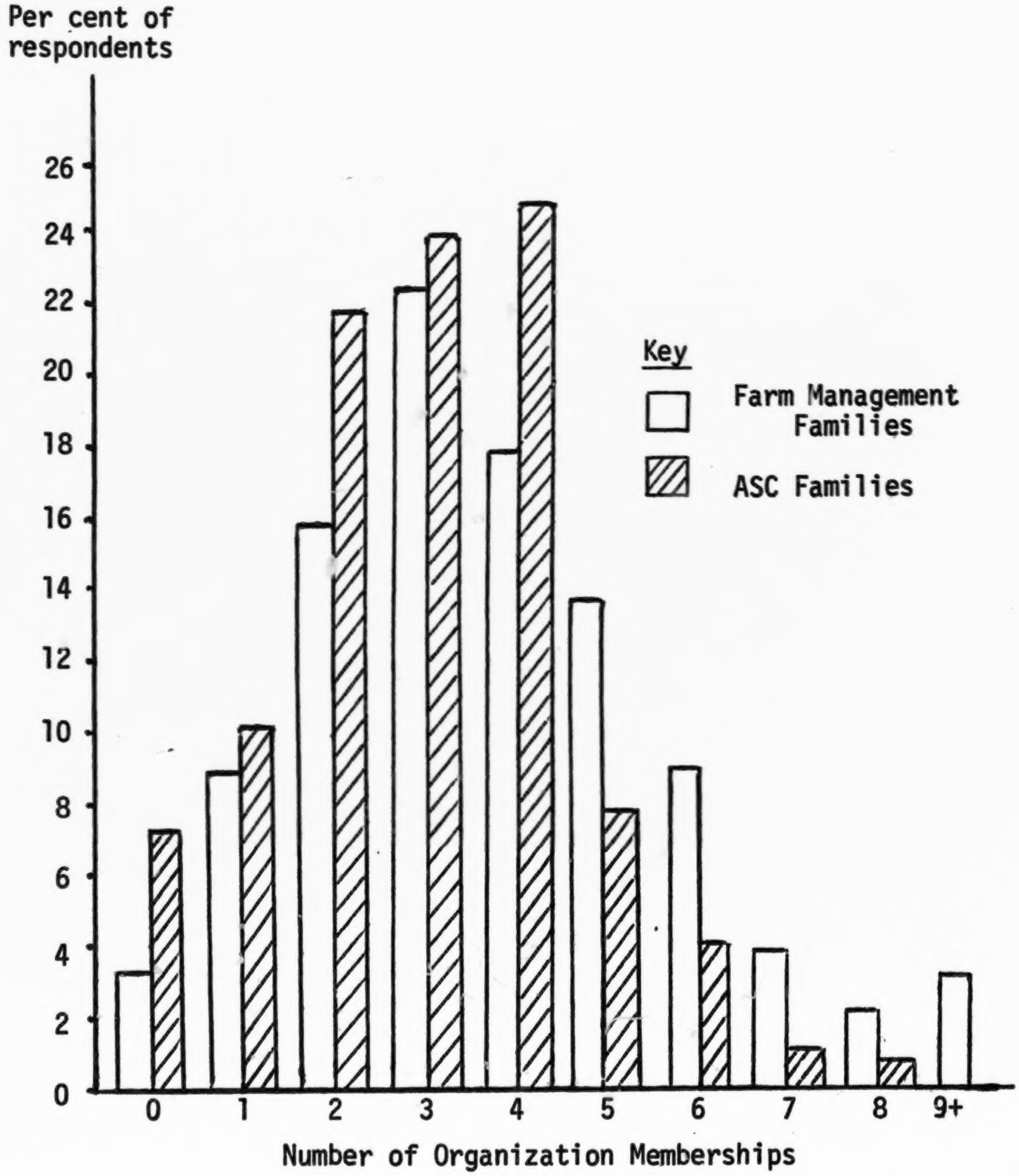

Figure 3. THE DISTRIBUTION OF NUMBER OF ORGANIZATIONS IN WHICH FARM MANAGEMENT AND ASC FARM FAMILIES CLAIMED MEMBERSHIP[a]

[a] Mean ASC number of organizations: 2.9, standard deviation: 1.6
Mean FM number of organizations: 3.7, standard deviation: 2.2
Farm Management Families includes both participants and dropouts

Although it was not feasible to illustrate where each of the farm families in the study lived, counties from which ASC farm families were chosen and the seven farm management areas in the state are shown in Figure 4. Also shown are the number and per cent responses from farm management and ASC farm families. The range in per cent response for farm management families was 63% to 79%. The range for ASC families was 41% to 75%.

The results of any study can generalize to subjects not in the sample only to the extent the sample is representative. One way to evaluate the representativeness of the subjects who responded to the questionnaires was to compare them to families in farm management who didn't respond. Table 5 reports the means and standard deviations of farmer respondents and non-respondents for six variables measuring farm business size, income, years of farm management instruction, and farmer age.

There were two variables with statistically significant differences according to a t-test evaluation. Because of the large sample sizes, however, their estimated omega-squared values were small. Omega-squared (w^2) is an estimate of the proportion of variance in Y accounted for by X: it measures the strength of association between independent and dependent variables. Non-respondents were younger and had fewer years of farm management instruction than respondents. It was particularly important that farm business sizes in terms of acres, work units, total sales, and earnings were very similar. Also important was the lack of a practical difference between groups in the amount of farm management instruction.

Also related to the generalizability of results was the problem of whether or not families which received the questionnaire and an explanation in person would respond differently from families who received only a questionnaire and cover letter in the mail. Table 6 presents summary data concerning the 35 farm families who received a personal interview at their homes along with the same data for all farm families in farm management. The only relatively large differences are in the economic data: those families in the interview group made more money with lesser total sales and less capital. Otherwise the data are very similar. Of special concern are the nearly identical average education and farming attitude scores.

The Instrument

The farm family opinion inventory[a] consisted of 41 items in the education scale and 49 items in the farming scale. Respondents could react to each statement by marking a number

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[a] See appendix for a copy of the husband version.

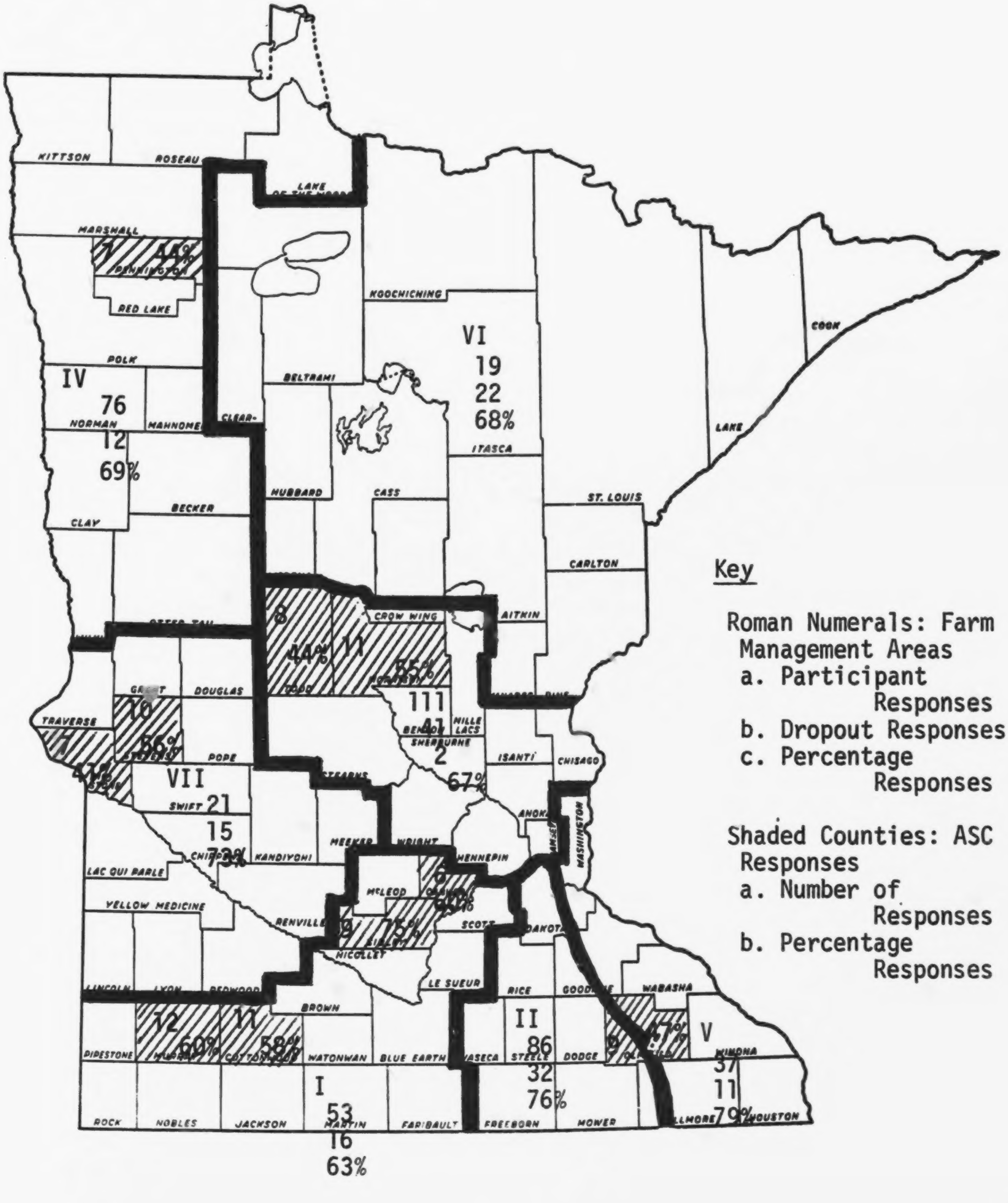
KITTSON
ROSEAU
LAKE OF THE WOODS
MARSHALL
7
44%
PENNINGTON
RED LAKE
KOOCHICHING
COOK
POLK
IV
76
12
69%
NORMAN
MAHNOMEN
CLEARWATER
BELTRAMI
VI
19
22
68%
ITASCA
LAKE
CLAY
BECKER
HUBBARD
CASS
ST. LOUIS
CARLTON
OTTER TAIL
WADENA
8
44%
11
55%
CROW WING
TODD
MORRISON
AITKIN
111
41
2
67%
BENTON
MILLE LACS
SHERBURNE
KANABEC
PINE
ISANTI
CHISAGO
GRANT
DOUGLAS
TRAVERSE
10
86%
STEVENS
POPE
7
41%
BIG STONE
VII
21
15
73%
SWIFT
STEARNS
CHIPPEWA
KANDIYOHI
MEEKER
WRIGHT
ANOKA
RAMSEY
WASHINGTON
HENNEPIN
LAC QUI PARLE
YELLOW MEDICINE
McLEOD
6
60%
CARVER
RENVILLE
9
75%
SIBLEY
SCOTT
DAKOTA
NICOLLET
LE SUEUR
LINCOLN
LYON
REDWOOD
BROWN
RICE
GOODHUE
WABASHA
12
60%
MURRAY
11
58%
COTTONWOOD
II
86
32
76%
9
47%
OLMSTED
V
37
11
79%
PIPESTONE
WATONWAN
BLUE EARTH
WASECA
STEELE
DODGE
WINONA
I
53
16
63%
ROCK
NOBLES
JACKSON
MARTIN
FARIBAULT
FREEBORN
MOWER
FILLMORE
HOUSTON
Key
Roman Numerals: Farm Management Areas
a. Participant Responses
b. Dropout Responses
c. Percentage Responses
Shaded Counties: ASC Responses
a. Number of Responses
b. Percentage Responses

Figure 4. STATEWIDE QUESTIONNAIRE RESPONSE PATTERN

Table 5

A COMPARISON OF FARMER RESPONDENTS AND NON-RESPONDENTS WITH FARM MANAGEMENT TRAINING

Variable	Farmer Respondents Mean	Farmer Respondents SD	Farmer Non-Respondents Mean	Farmer Non-Respondents SD	t	Estimated[b] w^2
Years of Instruction	4.89	2.83	4.04	2.72	3.49**	.018
Age	40.77	12.49	31.44	18.87	7.21**	.077
Education[a]	10.79	3.07				
Number of Children[a]	3.54	2.28				
Labor Earnings	$4405	5320	$4507	4413	.23	
Total farm sales	$31,390	38,831	$26,242	35,607	1.55	
Total Acres	353	220	347	264	.30	
Work units	517	289	479	224	1.59	
Sample Size	434[c]		186			

---

[a] No data for non-respondents because these two variables came from the questionnaire.

[b] Estimated omega-squared (w^2): $\frac{t^2 - 1}{t^2 + N_1 + N_2 - 1}$

[c] There were 35 husband responses without wives and 8 wife responses without husbands: the 8 wife responses are not included here because it wasn't certain they represented typical farm operations.

Table 6

COMPARATIVE DESCRIPTIVE STATISTICS FOR FARM FAMILIES RECEIVING A PERSONAL INTERVIEW AND ALL FARM MANAGEMENT FAMILIES

Variable[a]	Interview Group Mean	Interview Group Std. Dev.	All Farm Management Mean	All Farm Management Std. Dev.
1. Years of Instruction	5.93	2.55	4.86	2.82
2. Age	41.03	9.31	41.27	9.11
3. Education (years)	11.69	2.20	11.78	2.16
4. Number of children	4.08	2.19	3.82	2.08
5. Number of Organizations	3.26	2.18	3.75	2.19
6. Labor Earnings	$5082	$5053	$4400	$5359
7. Total Farm Sales	$27,061	$14,437	$31,519	$39,167
8. Acres in Farm	380	247	357	220
9. Work Units	518	205	530	283
10. Total Capital	$59,979	$37,741	$67,120	$48,631
11. Education Attitude Score	123.74	3.93	123.12	7.45
12. Farming Attitude Score	151.25	6.29	151.26	10.53

[a] Variables six through ten include identical data for a husband and wife from the same farm: there were 43 farms without this double weighting.

Note: Persons in the interview group were a subset of all farm management families.

by each item to show if they strongly agreed, agreed, were undecided, disagreed or strongly disagreed with each statement.

Validity

There are three generally accepted types of validity: content, empirical and construct validity. In its developmental stages, the instrument was evaluated for face or content validity by staff members and graduate students of the Agricultural Education Department. Items not seemingly related to education or farming attitudes were eliminated.

Although the proportion of variance in attitude scores accounted for by knowing years of instruction was not great, the concurrent or empirical validity as estimated by inspecting the relationship between attitudes and income supported this measure of validity.

There was no explicit effort in this study to estimate construct validity, although both the attitude and income responses to education inputs showed similar patterns and degree of accurate prediction.

Reliability

There are several measures of reliability. Test-retest reliability was employed in this study for two reasons: it was an estimate of how well the instrument measured the same thing at two different administrations and suggested the degree of attitude stability. The test-retest reliability for the total education scale was .814 and .481 for farming for 61 respondents.

Internal Consistency

The most used measure of instrument accuracy was internal consistency. Table 7 shows both total scale and subscale Hoyt internal reliabilities for each of the education and farming dimensions.

To illustrate which items went into each of the eight clusters, Table 8 reports the cluster, or subscale number, its title, the items included and their response weightings after the reciprocal averages procedure. There were four clusters retained within the education group and a like number designed to measure farming attitudes.

Table 9 shows the subscales derived from the factor analysis procedure with the items included in each subscale and the final response weights after reciprocal averages. There were three factors retained within the education group and three factors related to farming attitudes.

Table 7

ATTITUDE INSTRUMENT INTERNAL CONSISTENCY

Scale		Initial Reliability[a]	Final Reliability[a]
Total Education Scale		.715	.919
Total Farming Scale		.857	.878
Cluster Subscales			
Education	I	.295	.841
	II	.557	.575
	III	.393	.438
	IV	.612	.651
Farming	I	.820	.859
	II	.432	.459
	III	.507	.546
	IV	.514	.670
Factor Analysis Subscales			
Education	I	.101	.877
	II	.635	.635
	III	.641	.641
Farming	I	.784	.802
	II	.383	.507
	III	.492	.589

[a] Hoyt reliability coefficient: $r_{tt} = \frac{MS_A - MS_C}{MS_A}$

Where MS_A = mean square individuals

MS_C = mean square residual

Table 8

EDUCATION AND FARMING SUBSCALES DERIVED FROM CLUSTER ANALYSIS

Cluster	Title	Item	Response Weights After Reciprocal Averages				
EDUCATION:			SA	A	U	DA	SDA
I	Consolidation	40. Consolidation is a good idea because it is more economical - better facilities at less cost	5	4	3	2	1
		41. Consolidation is a good idea because larger schools attract better teachers.	5	4	3	2	1
		3. Consolidation is a good idea because larger schools offer a greater variety of subjects.	5	4	3	2	1
		8. Consolidation is a poor idea because classes get too large - less personal attention.	1	3	3	4	5
		15. Consolidation is a poor idea because small schools provide better education.	1	2	3	3	5
		38. Bigger schools have better teachers and books and more money to keep up with the recent trends in education.	5	4	3	2	1
		27. Farmers who have gone to college seem to enjoy life more.	4	3	3	3	2
		9. I respect a man with a college education.	4	3	3	3	1
II	General Value of Education	31. I wish I could have learned more about math and science when I went to school.	5	4	3	1	1

Table 8 (Continued)

Cluster	Title	Item	Response Weights After Reciprocal Averages				
			SA	A	U	DA	SDA
		33. I wish I could have gone to school for more years than I did.	5	4	3	1	1
		1. The more education a man has, the better he is able to enjoy life.	5	4	3	2	2
III	Education Policy	5. Tax money should be used to pay tuition for college students who can't afford to go to college otherwise.	5	4	3	2	1
		10. College education should be free to all who want it and can qualify.	4	4	4	2	1
		28. Education should be compulsory through 14 grades.	5	4	3	2	1
IV	Negative Education Attitudes	35. The most important part of a boy's education should be obtained through hard work at many tasks around the farm.	4	2	2	1	1
		36. A farmer can get all the information he needs from farm publications and county agents.	5	2	2	1	1
		16. Education is to blame for burning of draft cards and university riots.	4	2	1	1	1
		32. Young people are getting too much education.	5	3	2	1	1
		12. A college education for a farmer costs more than it's worth.	3	2	1	1	1

Table 8 (Continued)

Cluster	Title	Item	Response Weights After Reciprocal Averages				
FARMING:			SA	A	U	DA	SDA
I	Conser-vatism, Tradition-alism	15. We find it best not to be the first to try a new farming method.	4	2	2	1	2
		41. Farmers should be careful about using new methods and products until they have seen them work on other farms.	4	2	2	1	2
		35. Farmers should use credit only when absolutely necessary.	4	2	2	1	2
		22. A farmer should be conservative about spending.	4	1	1	1	1
		32. Once out of debt, a farmer should try to stay out.	4	2	2	1	1
		20. Borrowing puts a farmer at the mercy of the lender.	5	2	2	1	2
		30. An ideal farm is one on which all the work can be done by the farmer and his family.	3	1	1	1	1
		28. A farmer should exchange work with a neighbor instead of hiring things done.	4	2	1	1	2
		38. The land is the foundation of the family.	4	2	1	1	3
		34. Good hard work and lots of it is the only way to be a successful farmer.	4	2	2	1	2

Table 8 (Continued)

Cluster	Title	Item	Response Weights After Reciprocal Averages				
			SA	A	U	DA	SDA
		31. Farming is important to me because of working the soil, living close to nature, and being away from the fast pace of city life.	3	1	1	1	1
		12. A lot of ambition could offset the need to use borrowed money in farming.	4	2	2	1	2
		33. Being your own boss is the best part of farming.	3	1	1	1	2
		2. Bankers are interested in receiving the highest possible interest rate, regardless of the effect on farmers.	3	2	1	1	2
		24. Farming decisions should be based mostly on experience.	4	2	1	1	2
		1. Young farmers should have a goal of owning their own land someday.	2	1	1	1	2
		11. The only real wealth is produced by the farmer.					
		8. It takes more management ability to operate a farm than any business in the city.	3	1	1	1	3
		7. The farmer is more likely to enjoy his work than are most city people.	3	1	1	1	3
		44. Farm prices being set by private marketing organizations has caused low farm income.	3	2	1	1	3

Table 8 (Continued)

Cluster	Title	Item	Response Weights After Reciprocal Averages				
			SA	A	U	DA	SDA
		5. You've got to work year 'round in farming.	3	1	1	1	2
		6. New ideas in farming have to be tempered with the old.	3	1	1	1	2
		47. Instead of depending on savings, a farmer should use credit in expanding and operating his farm.	2	1	2	2	3
		37. Most articles in farm magazines are impractical.	3	2	2	1	3
		9. Credit should be used as a part of the operating funds in the farm business.	2	1	2	2	5
II	Rational, Independent	16. Prices should be left free without controls to farm production.	5	4	4	2	2
		29. The less government in business activities, the better.	4	4	3	1	1
		45. The most successful farmer is one who has interests and rewards that don't depend on income.	5	4	4	2	1
		19. Farmers have had too little advertising of their products, thus causing low farm incomes.	5	4	3	2	1
		17. There is not enough research in agriculture.	5	4	3	2	2
III	Innovativeness	18. Farmers who don't use new ideas don't stay in farming very long.	5	3	3	2	1

Table 8 (Continued)

Cluster	Title	Item	Response Weights After Reciprocal Averages SA	A	U	DA	SDA
		46. Farm management education helps a farmer do a better job of farming.	4	3	1	2	1
		3. I like to try new farming ideas.	5	3	1	1	1
		42. I think I'm among the first to adopt a new farm practice.	5	4	3	2	3
IV	Farm Problems	10. Too much farm production has caused low farm incomes.	4	5	5	5	2
		26. Controlling a lot of land is important in the competitive business of farming.	5	5	5	5	2
		25. Because some farmers can raise crops for a lot less cost per acre, some families are being forced out of farming.	5	5	5	4	1
		40. Too much over-all production due to high price supports causes low incomes.	5	5	5	4	3

Table 9

EDUCATION AND FARMING SUBSCALES DERIVED FROM FACTOR ANALYSIS

Item	Response Weights After Reciprocal Averages				
EDUCATION:	SA	A	U	DA	SDA
Factor I - Consolidation					
3. Consolidation is a good idea because larger schools offer a greater variety of subjects.	5	4	3	2	1
40. Consolidation is a good idea because it is more economical--better facilities at less cost.	5	4	3	2	1
41. Consolidation is a good idea because larger schools attract better teachers.	5	4	3	2	1
8. Consolidation is a poor idea because classes get too large--less personal attention.	1	3	3	4	5
15. Consolidation is a poor idea because small schools provide better education.	1	2	3	4	5
38. Bigger schools have better teachers and books and more money to keep up with recent trends in education.	5	4	3	2	1
Factor II - Non-economic values of education					
1. The more education a man has, the better he is able to enjoy life.	5	3	3	2	1
27. Farmers who have gone to college seem to enjoy life more.	5	4	3	2	1
26. Education is good even if it only helps parents to help their children with homework.	5	4	3	2	1
28. Education should be compulstory through 14 grades.	4	4	4	3	1
9. I respect a man with a college education.	5	3	3	2	1

Table 9 (Continued)

Item	Response Weights After Reciprocal Averages				
	SA	A	U	DA	SDA
17. High schools should concentrate on preparing people for college	4	3	3	2	1
Factor III - Negative values of education					
16. Education is to blame for burning of draft cards and university riots.	4	3	3	2	1
32. Young people are getting too much education.	5	4	3	2	1
36. A farmer can get all the information he needs from farm publications and county agents.	5	3	2	2	1
35. The most important part of a boy's education should be obtained through hard work at many tasks around the farm.	4	3	2	1	1
14. School training is of little help in facing the real problems of life.	3	3	3	2	1
12. A college education for a farmer costs more than its worth.	3	3	2	2	1
FARMING:					
Factor I - Traditional Farming Attitudes					
31. Farming is important to me because of working the soil, living close to nature, and being away from the fast pace of city life.	4	3	1	1	1
7. The farmer is more likely to enjoy his work than are most city people.	4	2	2	1	1
30. An ideal farm is one on which all the work can be done by the farmer and his family.	5	2	1	1	1
8. It takes more management ability to operate a farm than any business in the city.	4	2	2	1	1

Table 9 (Continued)

Item	Response Weights After Reciprocal Averages				
	SA	A	U	DA	SDA
11. The only real wealth is produced by the farmer.	5	3	3	2	2
38. The land is the foundation of the family.	5	3	2	1	1
33. Being your own boss is the best part of farming.	4	2	2	1	3
28. A farmer should exchange work with a neighbor instead of hiring things done.	5	3	2	1	1
35. Farmers should use credit only when absolutely necessary.	5	3	3	1	1
1. Young farmers should have a goal of owning their own land someday.	4	2	1	1	2
32. Once out of debt, a farmer should try and stay out.	5	3	2	2	1
34. Good hard work and lots of it is the only way to be a successful farmer.	5	3	3	2	2
22. A farmer should be conservative about spending.	5	2	2	1	4
Factor II - Innovativeness and Progressiveness					
3. I like to try new farming ideas.	4	3	1	2	1
42. I think I'm among the first to adopt a new farm practice.	5	4	3	3	2
48. Farm management education helps a farmer do a better job of farming.	4	3	2	2	1
34. Good hard work and lots of it is the only way to be a successful farmer.	5	4	4	3	3
18. Farmers who don't use new ideas don't stay in farming very long.	5	4	3	2	2

Table 9 (Continued)

Item	Response Weights After Reciprocal Averages				
	SA	A	U	DA	SDA
4. Betting only on good chances is generally a good policy.	5	4	3	2	3
12. A lot of ambition could offset the need to use borrowed money in farming.	5	4	3	3	3
Factor III - Conservatism in Farming					
10. Too much farm production has caused low farm incomes.	5	4	4	3	1
25. Because some farmers can raise crops for a lot less cost per acre, some families are being forced out of farming.	5	4	4	3	1
26. Controlling a lot of land is important in the competitive business of farming.	5	5	4	4	2
24. Farming decisions should be based mostly on experience.	4	4	3	3	1
40. Too much over-all production due to high price supports causes low farm incomes.	5	5	4	3	3
4. Betting only on good chances is generally good policy.	5	4	3	3	1

Findings

Cluster Analysis

The first specific question in this study was: what is the relationship between attitudes and farm management instruction? The summary of regression analyses based on cluster analyzed attitude scores in Table 10 provides an overview of the answer. The central point of importance was the consistency of the shapes and directions of the regression lines which were statistically significant. The subscales which were negatively worded had lines with negative slopes: a decrease in negative attitudes was associated with an increment in farm management instruction. In all the cases in which the regression was significant for Farming Subscale I, the best fit was a second degree equation, which suggested a diminishing returns effect.

It was important to divide the samples into two parts to determine the differential effects of two levels of instruction intensity. Some farm management programs had written, well-organized course outlines and the subject matter divided roughly into three years of instruction. Not all adult vocational agriculture instructors had full-time responsibilities with adult farmers: some had high school students as well. In Table 10, the subsample designated "well-organized programs" refers to those well-organized courses in farm business management education for which a full-time adult vocational agriculture instructor was responsible.

Another important observation in Table 10 was the fact that farm management instruction was significantly related to a change in only one attitude subscale for farm husbands in well-organized programs. There was a positive linear relationship between attitudes toward innovation and years of instruction. On the other hand, there were two different significant findings for farm husbands in other than well-organized programs. The Education Subscale II and the Farming Subscale I attitude scores were both significantly related to instruction.

Table 10

SUMMARY OF CURVILINEAR REGRESSION ANALYSES
OF THE RELATIONSHIP BETWEEN SUBSCALE
ATTITUDE SCORES AND INSTRUCTION

Subsample	Subscale[a]	Degree Polynominal[b]	R
All Farm Families			
Education	I	3	.089
	II	NS	
	III	NS	
	IV	1	.113
Farming	I	2	.124
	II	NS	
	III	1	.174
	IV	NS	

Table 10 (Continued)

Subsample	Subscale[a]	Degree Polynominal[b]	R
Farm Husbands			
Education	I	NS	
	II	NS	
	III	NS	
	IV	1	.119
Farming	I	2	.136
	II	NS	
	III	3	.233
	IV	NS	
Farm Management Husbands			
Education	I	NS	
	II	NS	
	III	NS	
	IV	2	.125
Farming	I	2	.130
	II	NS	
	III	1	.113
	IV	NS	
Farm Management Husbands in Well-Organized Programs			
Education	I	NS	
	II	NS	
	III	NS	
	IV	NS	
Farming	I	NS	
	II	NS	
	III	1	.150
	IV	NS	
Farm Management Husbands in Other Than Well-Organized Programs			
Education	I	NS	
	II	NS	
	III	NS	
	IV	2	.194
Farming	I	2	.185
	II	NS	
	III	NS	
	IV	NS	

[a] The subscales were derived from cluster analysis of the item intercorrelations for each scale: education and farming.

[b] The equations reported were significant at the .05 level.

There was a general diminishing returns effect operating after the first year or two of farm management instruction, as illustrated in Figure 5. Farm families with no farm management instruction had somewhat higher average scores on the consolidation subscale than families with one or two years of instruction. The most positive attitudes toward consolidation were expressed by farm families who had participated for seven years and then there was a less positive attitude in the years eight, nine and ten.

If there were positive results of farm management instruction effects on education attitudes, the negatively sloping line in Figure 6 would have been expected. Education Subscale IV measured negative attitudes toward education and, as the figure shows, there was a decrease in negative attitudes associated with more years of farm management instruction.

There is a suggestion of a diminishing returns effect in Figure 7. Because Farming Subscale I is negatively worded in its estimate of conservatism and traditionalism, the decrease in attitude scores associated with years of instruction to year six and seven is a positive gain. At the eighth year, however, there is a loss in improved attitudes, which suggests a diminishing marginal return.

Because farm management instruction is designed to help farm families improve their income, innovation is one of the implied goals. Figure 8 shows that farm families are more positively oriented toward innovation if they have had more years of farm management education. The best fitting regression line is positive and linear which indicates an equal increase each year.

In most farm families it is the husband who makes most of the decisions related to the farm business. Figure 9 reports a negative linear relationship between years of instruction and Education Subscale IV attitude scores of males only. Education Subscale IV, however, was negatively worded so that Figure 9 actually indicates a positive return to investments in education.

For males, a diminishing returns effect was evident in the relationships of years of instruction to Farming Subscale I attitude scores. As Figure 10 shows, there was a decrease in negative attitudes toward liberalism and being contemporary up to the sixth and seventh year and then negative attitudes increased.

The only relationship in this part of the study suggesting a learning curve was the regression line in Figure 11 showing attitudes toward innovation for farm husbands. There was a rapid rate of increase until the third year of instruction at which time there seemed to be a plateau. At the eighth year there was again a sharp increase in the rate of attitude change.

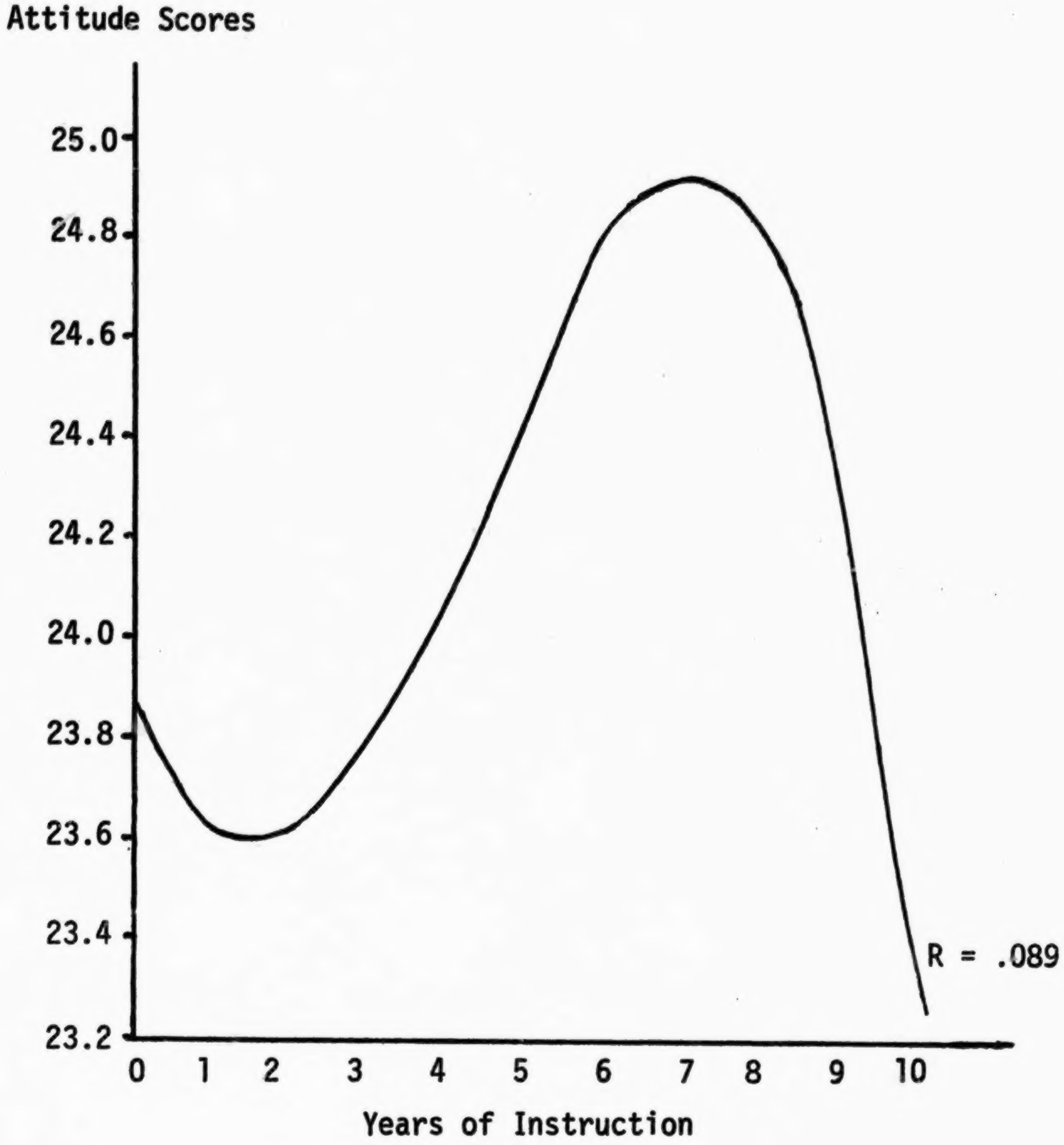

Figure 5. RELATIONSHIP BETWEEN EDUCATION SUBSCALE I* ATTITUDE SCORES AND INSTRUCTION FOR ALL FARM FAMILIES.

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* From the cluster analysis of item responses.

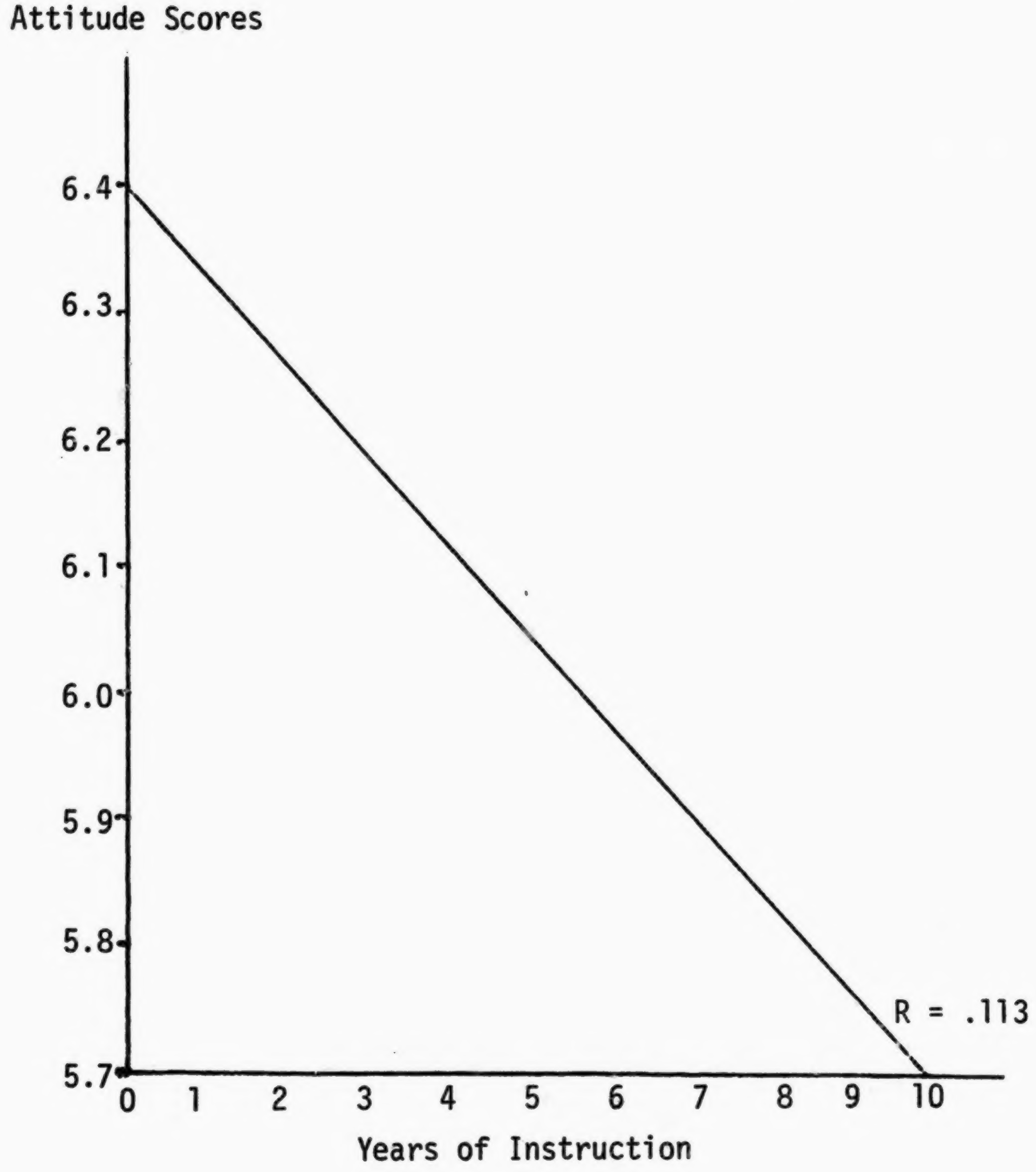

Figure 6. RELATIONSHIP BETWEEN EDUCATION SUBSCALE IV* ATTITUDE SCORES AND INSTRUCTION FOR ALL FARM FAMILIES.

* From the cluster analysis of item responses.

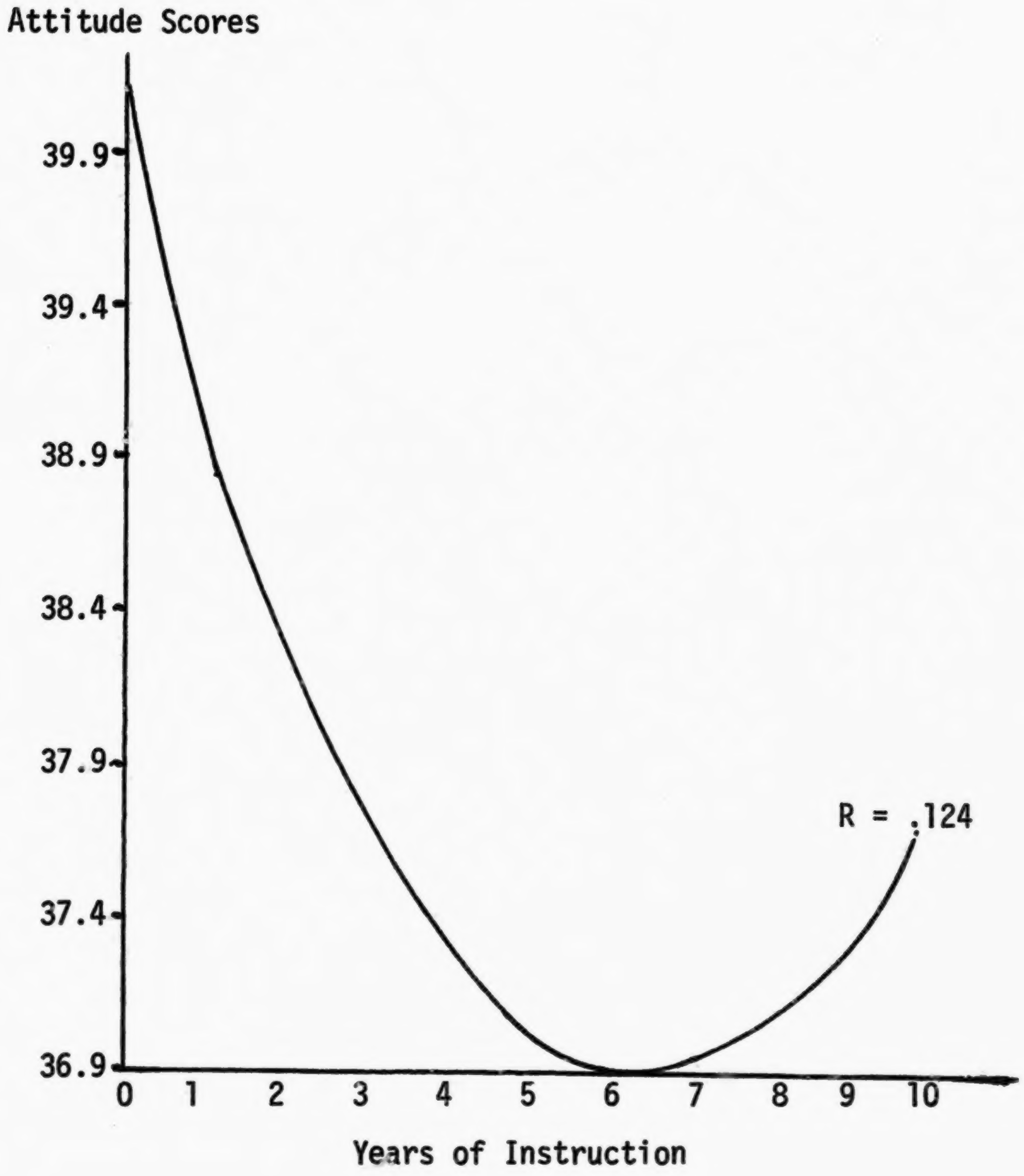

Figure 7. RELATIONSHIP BETWEEN FARMING SUBSCALE I* ATTITUDE SCORES AND INSTRUCTION FOR ALL FARM FAMILIES.

* From the cluster analysis of item responses.

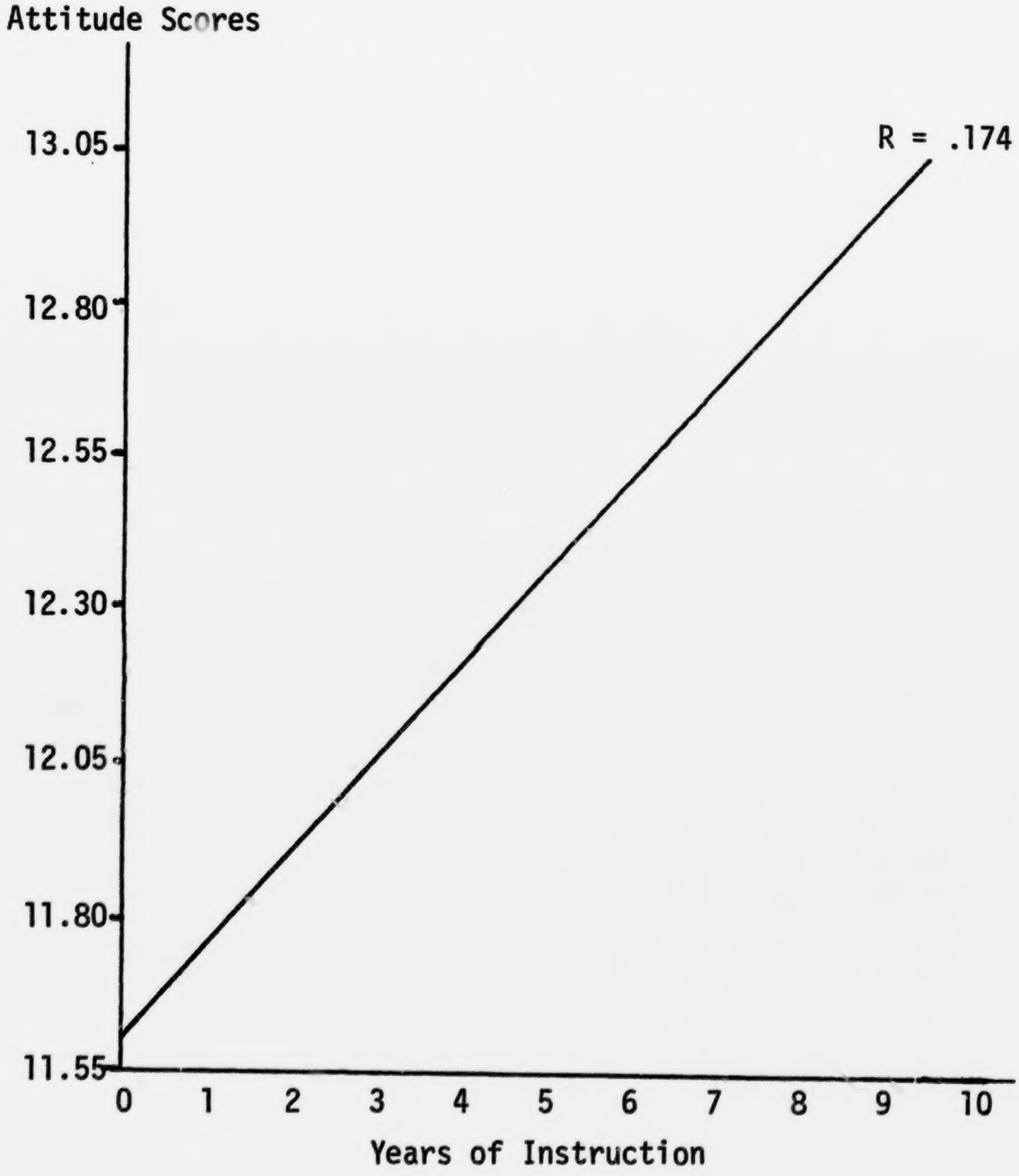

Figure 8. RELATIONSHIP BETWEEN FARMING SUBSCALE III* ATTITUDE SCORES AND INSTRUCTION FOR ALL FARM FAMILIES.

* From the cluster analysis of item responses.

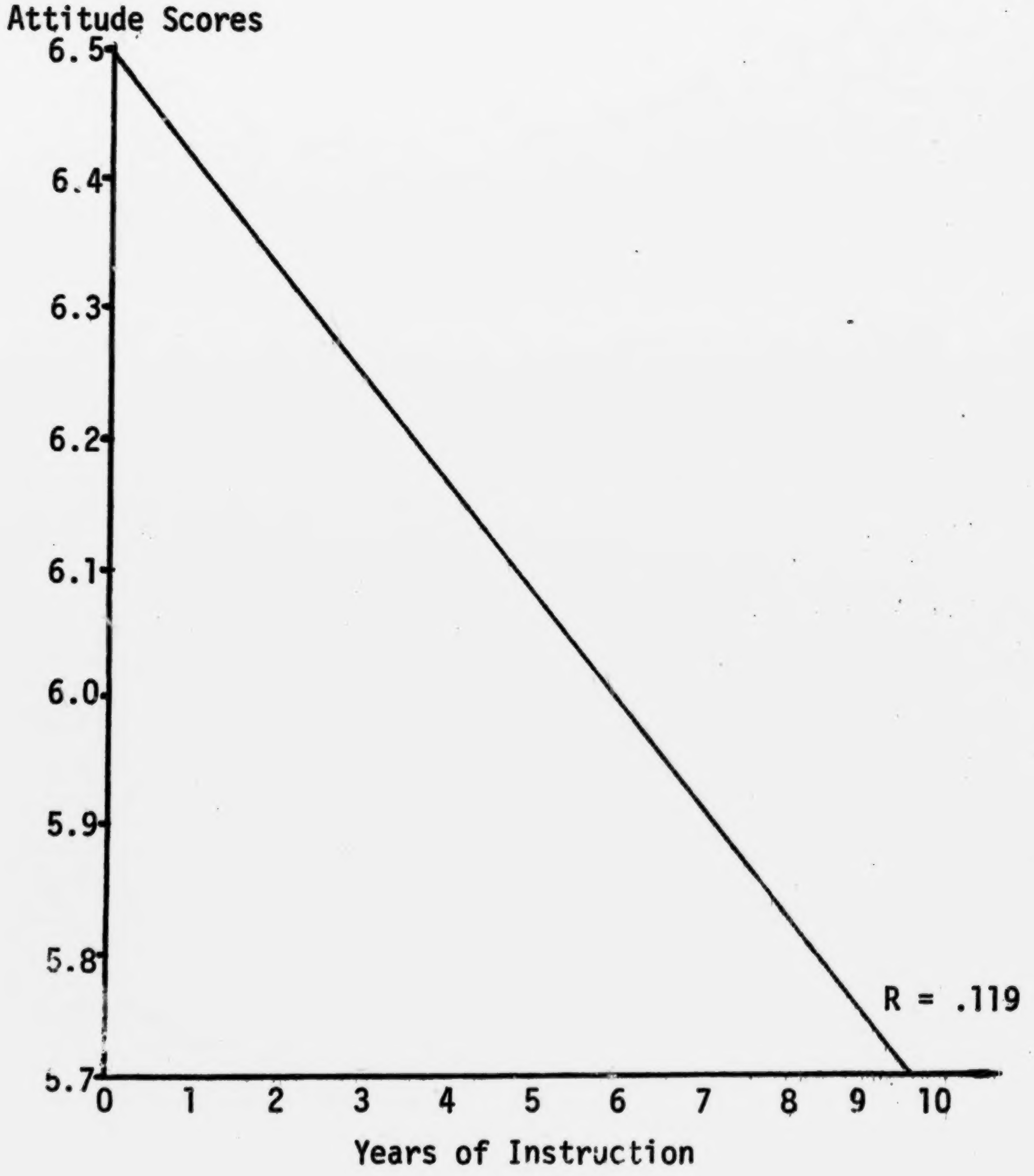

Figure 9. RELATIONSHIP BETWEEN EDUCATION SUBSCALE IV* ATTITUDE SCORES AND INSTRUCTION FOR ALL FARM HUSBANDS.

* From the cluster analysis of item responses.

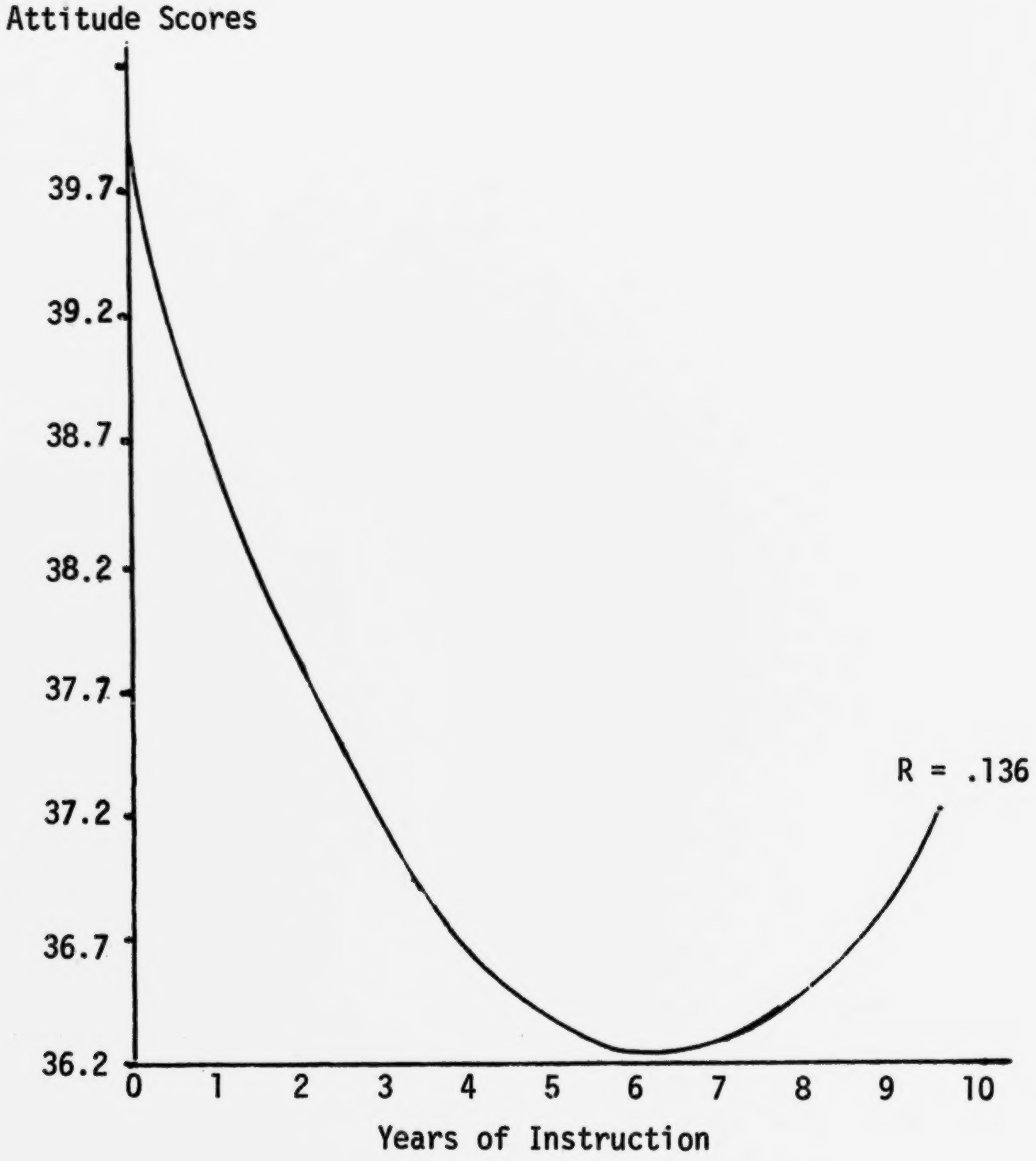

Figure 10. RELATIONSHIP BETWEEN FARMING SUBSCALE I* ATTITUDE SCORES AND INSTRUCTION FOR ALL FARM HUSBANDS.

*From the cluster analysis of item responses.

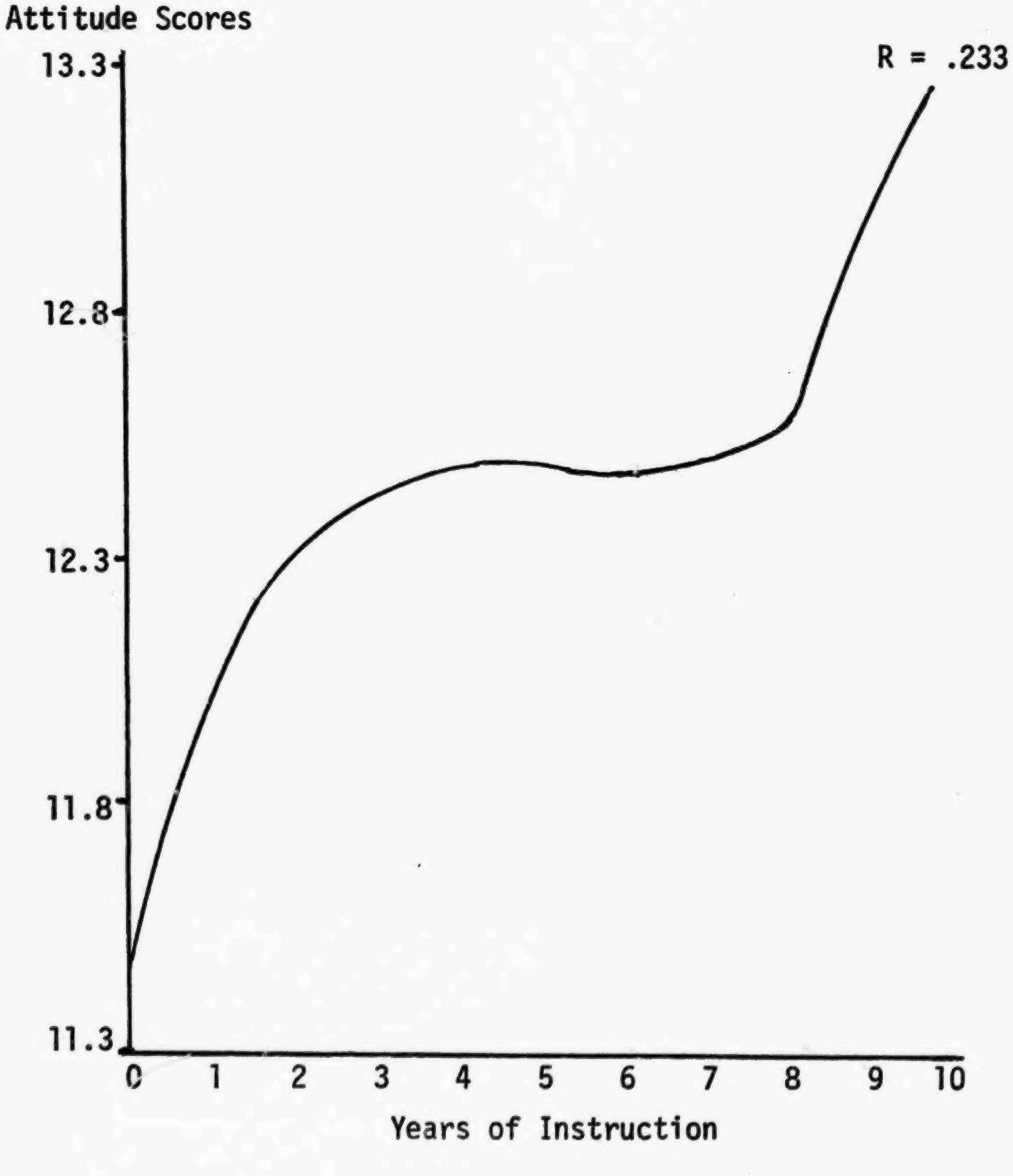

Figure 11. RELATIONSHIP BETWEEN FARMING SUBSCALE III* ATTITUDE SCORES AND INSTRUCTION FOR ALL FARM HUSBANDS.

* From the cluster analysis of item responses.

Figure 12 illustrates the relationship between Education Subscale IV attitude scores and instruction for farmers in farm management programs. The regression line suggests a diminishing returns because there is a sharp decrease in negative attitudes through the first four years, then the rate of change slows and by the seventh year of instruction there is an increase in negative attitudes toward education.

The same sort of curvilinear relationships for farm management husbands is evident in Figure 13 as in Figure 12. Again the farming subscale is negatively worded as was the Education Subscale IV, so that the regression line actually portrays a diminishing returns effect in which the most positive attitudes toward conservatism and traditionalism are at the sixth and seventh years of instruction.

Figures 14 and 15 both show a positive linear relationship between years of farm management instruction and attitude scores on a scale designed to measure innovativeness. Figure 14 reports the best fitting line for all farm management husbands and Figure 15 shows the regression line for farmers in well-organized programs.

There was a diminishing returns effect for farmers in other than well-organized programs. Figure 16 shows a reduction in the level of negative education attitudes to the sixth year of farm management instruction. Figure 17 shows the same general shaped curve, but represents the instruction-attitude relationship for conservative, traditional attitudes of farmers in other than well-organized programs. The most positive attitude score was at the sixth year of instruction.

Factor Analysis

Another way to attempt to answer the first question of the study, the relationship between instruction and attitude scores, was to perform a factor analysis with the item responses and then relate each factor score to years of instruction. Table 11 presents a summary of the curvilinear regression analyses of the relationship between factor analysis subscale scores and instruction.

In general, the factor analysis procedure failed to provide subscales with statistically meaningful relationships to instruction inputs.

Because the plots of the regression lines which best fit the data had so little range on the attitude score axis, this section presents only one graphical illustration. Only the education subscales had regression lines which were statistically significant at the .05 level. Figure 18 shows the

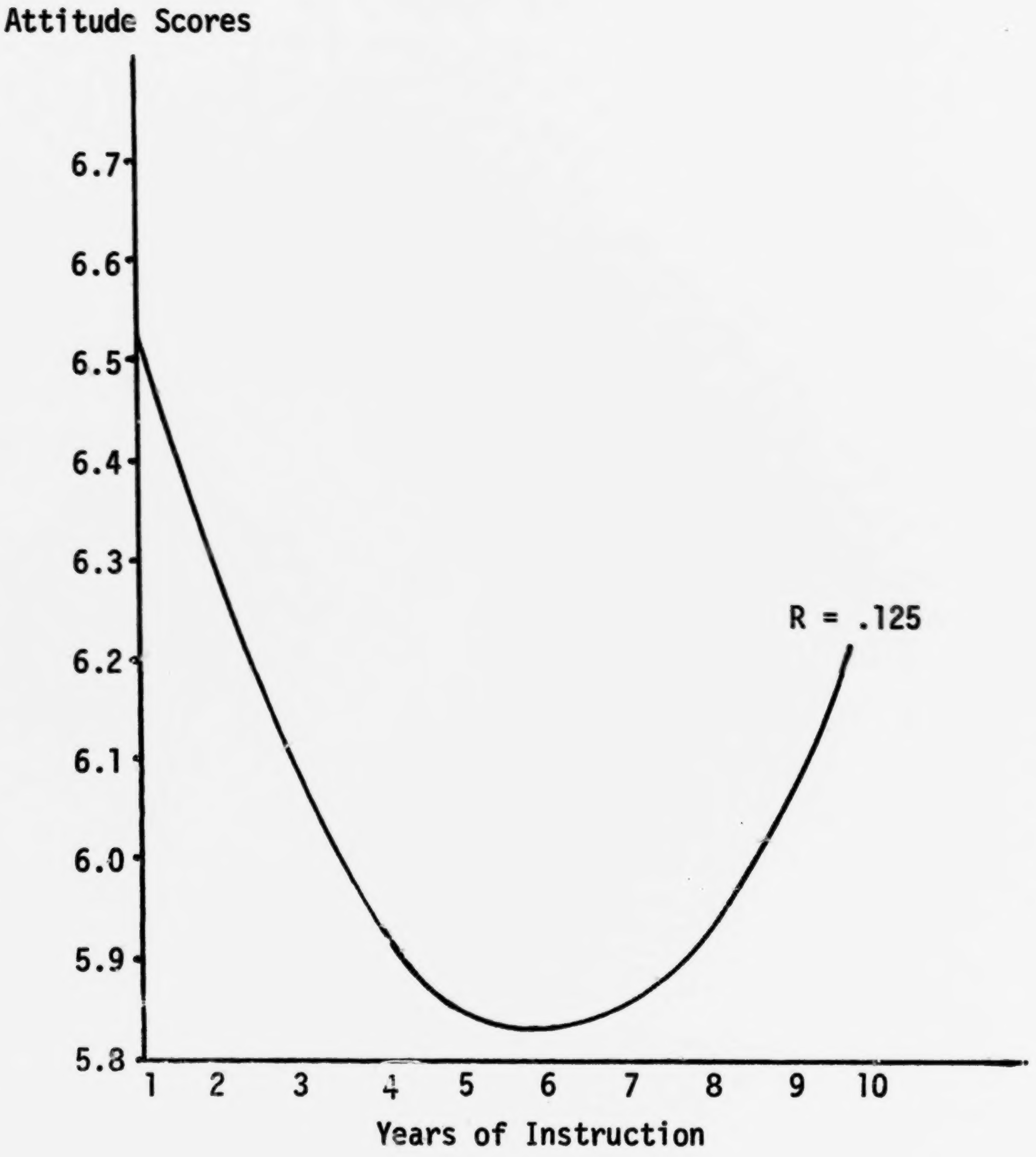

Figure 12. RELATIONSHIP BETWEEN EDUCATION SUBSCALE IV* ATTITUDE SCORES AND INSTRUCTION FOR FARM MANAGEMENT HUSBANDS.

* From the cluster analysis of item responses.

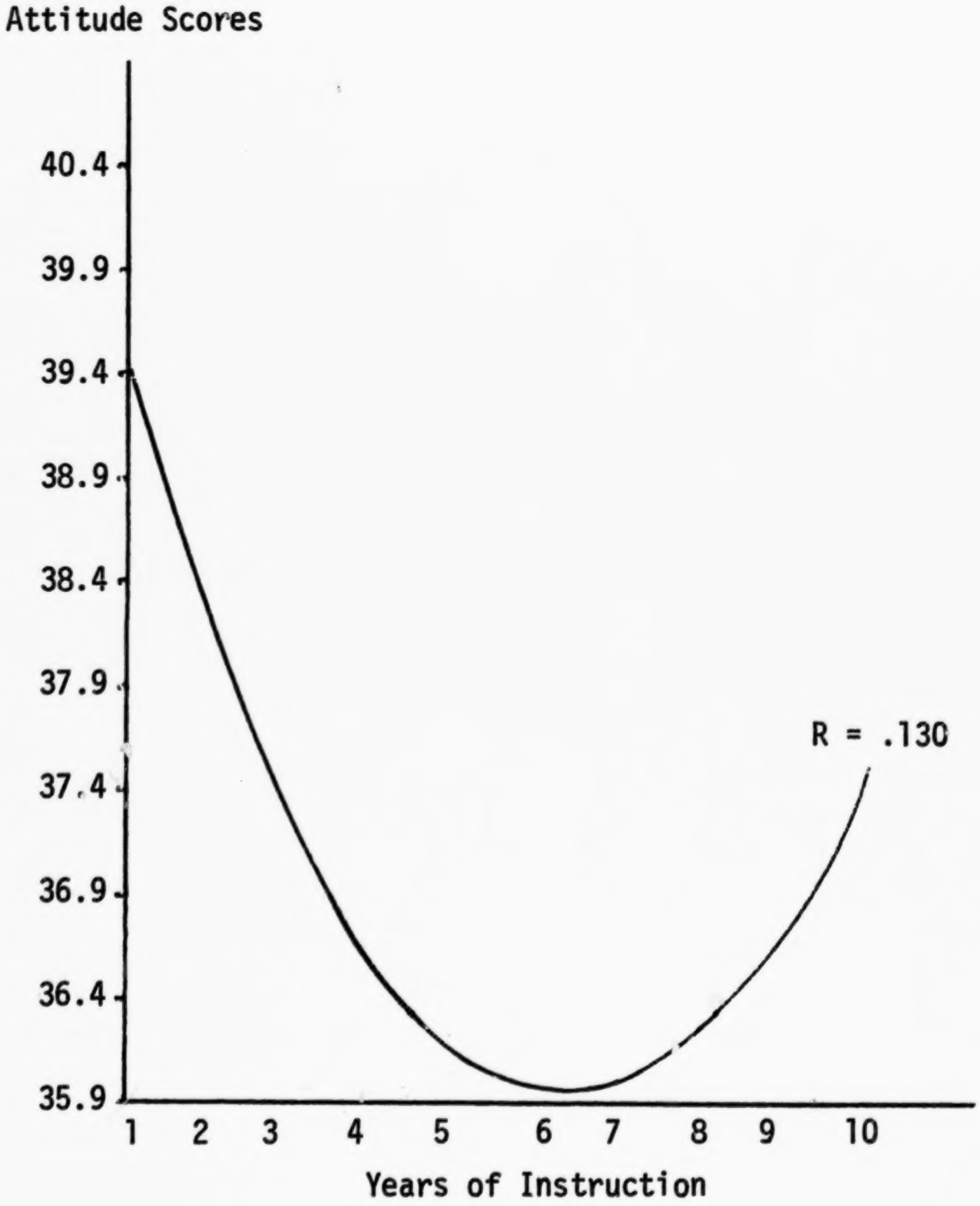

Figure 13. RELATIONSHIP BETWEEN FARMING SUBSCALE I* ATTITUDE SCORES AND INSTRUCTION FOR FARM MANAGEMENT HUSBANDS.

* From the cluster analysis of item responses.

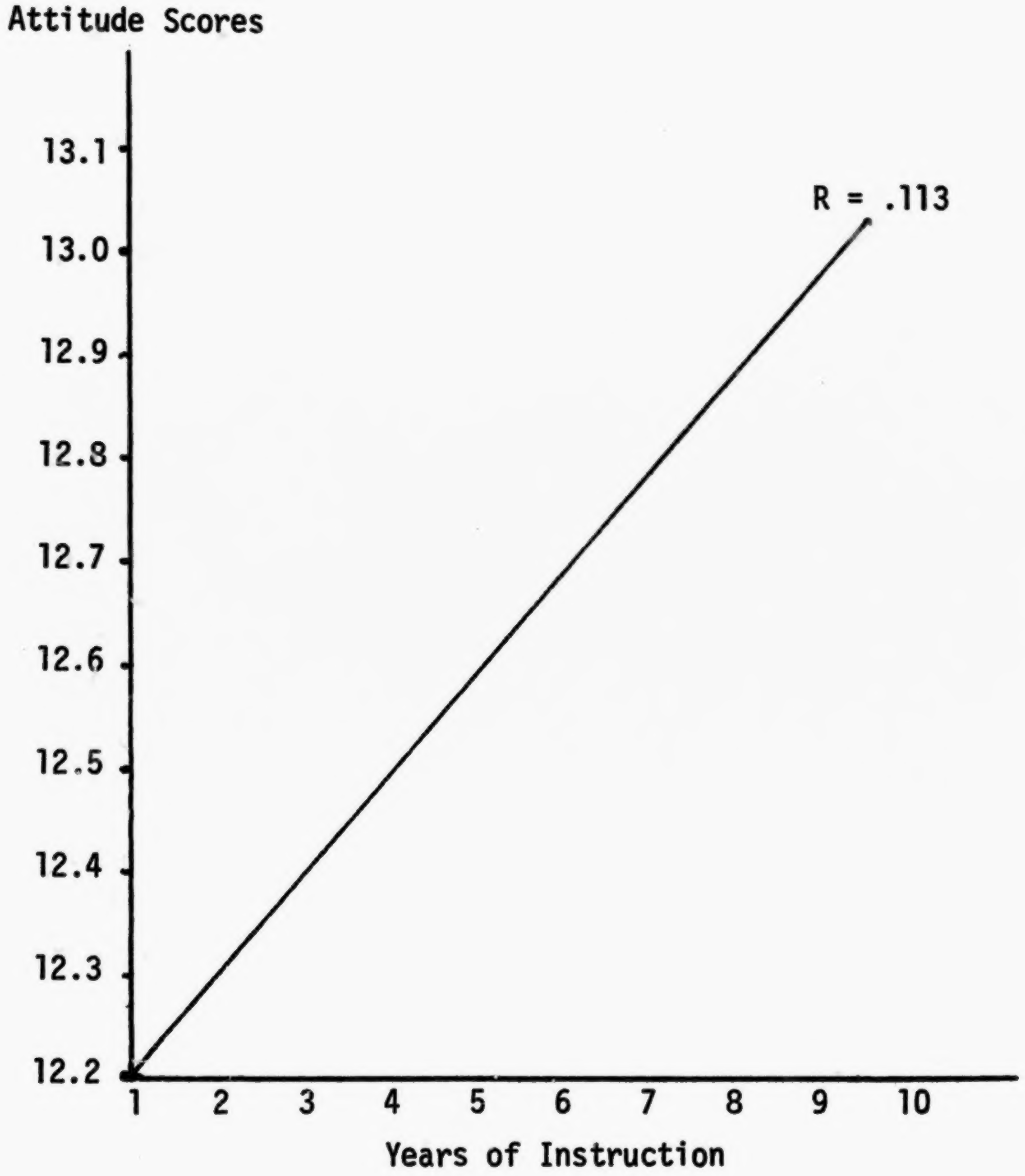

Figure 14. RELATIONSHIP BETWEEN FARMING SUBSCALE III* ATTITUDE SCORES AND INSTRUCTION FOR FARM MANAGEMENT HUSBANDS.

* From the cluster analysis of item responses.

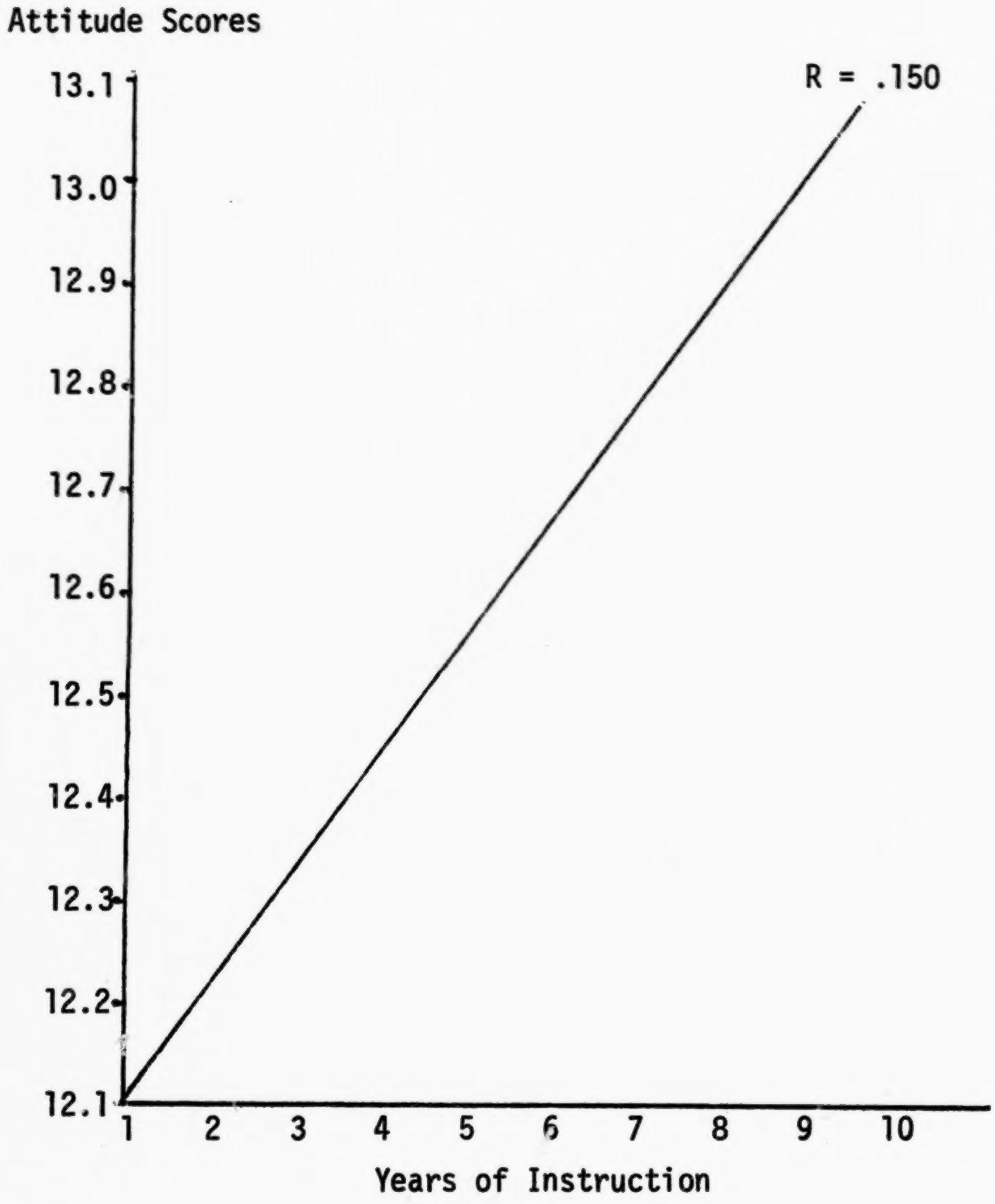

Figure 15. RELATIONSHIP BETWEEN FARMING SUBSCALE III* ATTITUDE SCORES AND INSTRUCTION FOR FARM HUSBANDS IN WELL-ORGANIZED PROGRAMS.

* From the cluster analysis of item responses.

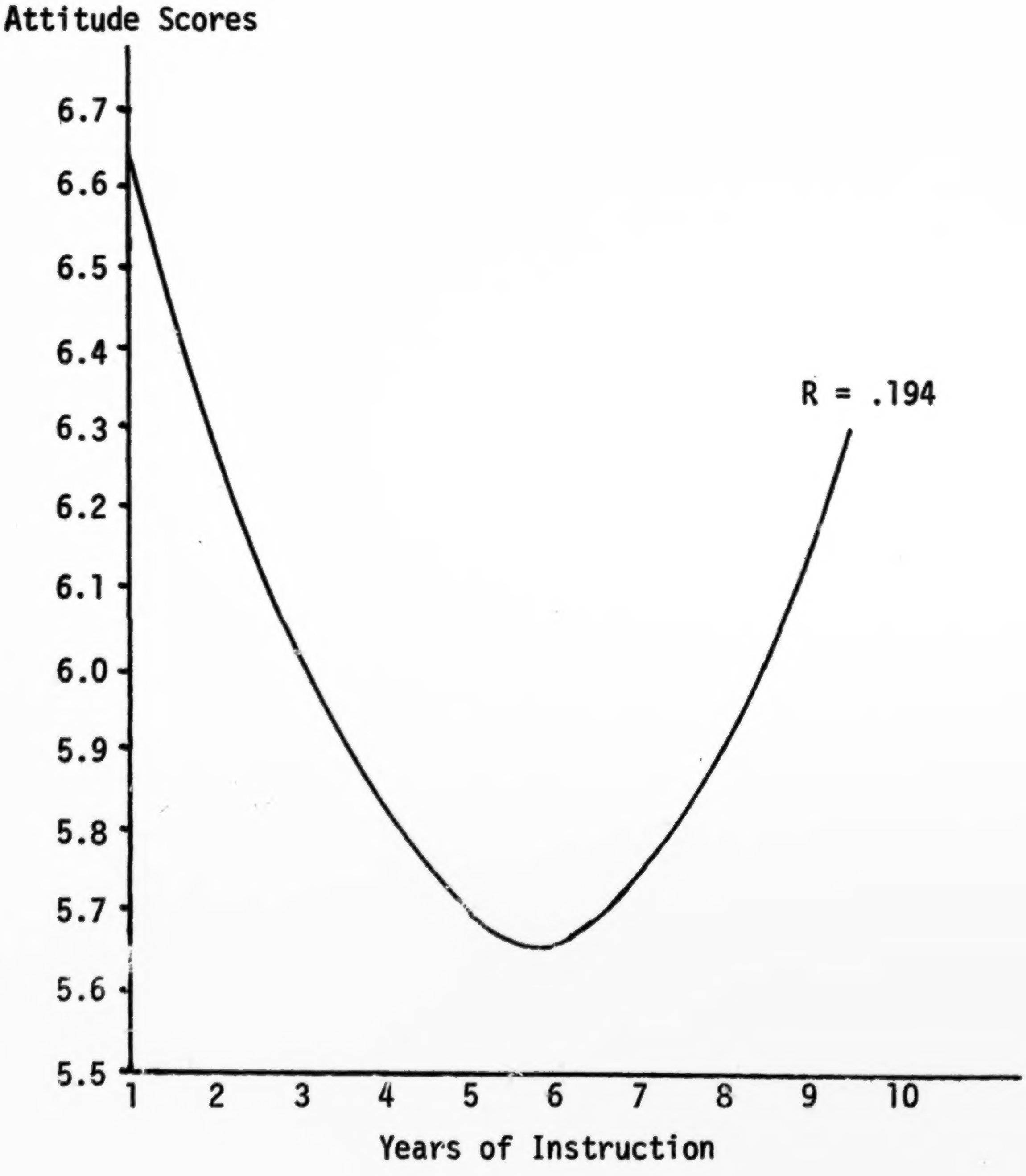

Figure 16. RELATIONSHIP BETWEEN EDUCATION SUBSCALE IV* ATTITUDE SCORES AND INSTRUCTION FOR FARM HUSBANDS IN OTHER THAN WELL-ORGANIZED PROGRAMS.

* From the cluster analysis of item responses.

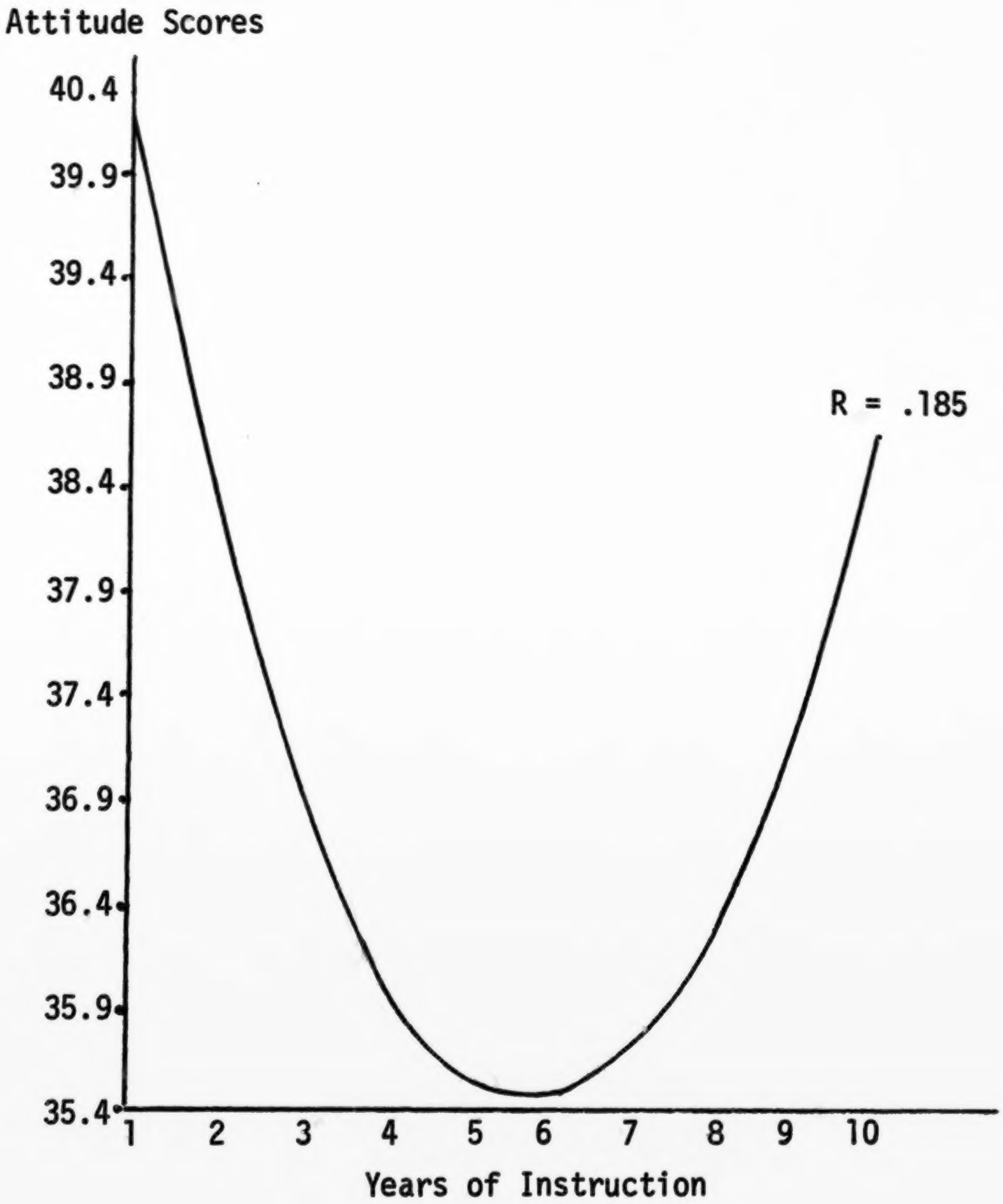

Figure 17. RELATIONSHIP BETWEEN FARMING SUBSCALE I* ATTITUDE SCORES AND INSTRUCTION FOR FARM HUSBANDS IN OTHER THAN WELL-ORGANIZED PROGRAMS.

* From the cluster analysis of item responses.

Table 11

SUMMARY OF CURVILINEAR REGRESSION ANALYSES OF THE RELATIONSHIP BETWEEN FACTOR ANALYSIS ATTITUDE SUBSCALE SCORES AND INSTRUCTION.

Subsample	Subscale	Degree Polynominal	Level of Significance	R
All Farm Families				
Education	I	3	.05	.092
	II	3	.05	.138
	III	1	.05	.068
Farming	I	1	.10	.056
	II	6	.10	.090
	III	NS		
Farm Management Families				
Education	I	2	.05	.089
	II	NS		
	III	NS		
Farming	I	NS		
	II	6	.25	.105
	III	NS		
Farm Management Families in Well-Organized Programs				
Education	I	NS		
	II	1	.05	.138
	III	5	.05	.131
Farming	I	5	.10	.131
	II	5	.25	.139
	III	5	.10	.164
Farm Families in Other Than Well-Organized Programs				
Education	I	1	.05	.110
	II	1	.25	.112
	III	1	.25	.116
Farming	I	NS		
	II	NS		
	III	NS		

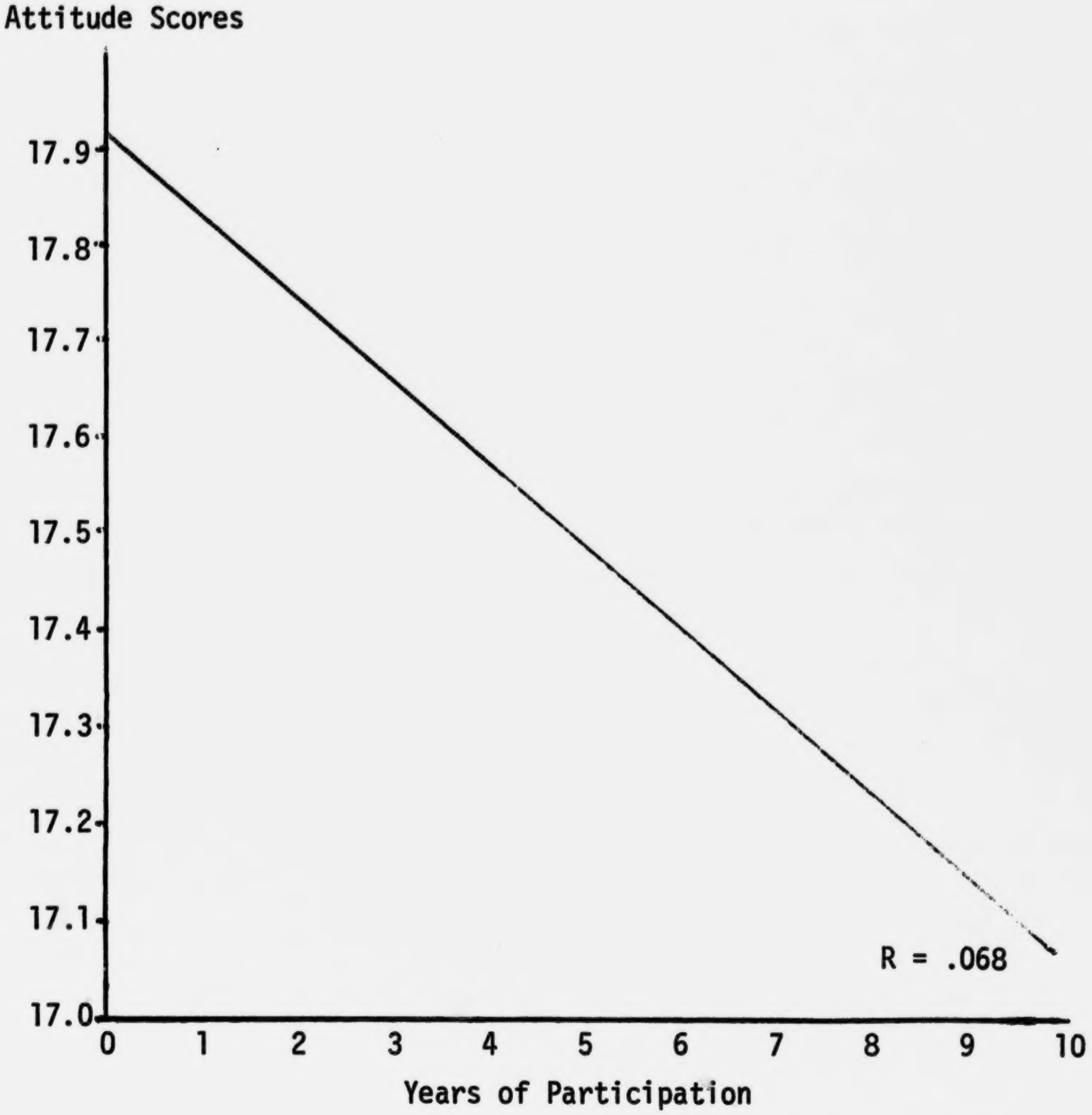

Figure 18. RELATIONSHIP BETWEEN EDUCATION SUBSCALE III* ATTITUDE SCORES AND INSTRUCTION FOR ALL FARM FAMILIES.

* From the factor analysis of item responses.

relationship between Education Subscale III attitude scores and instruction for all farm families. The subscale included negative statements about education so that the negatively sloping line indicates a slight improvement in attitude scores with additional years of instruction.

Total Scores

Just as intelligence is generally considered a composite of several dimensions which can be measured with verbal, arithmetic reasoning, and other subscales, so was it thought that attitudes might be additive and that total education and farming scores might be related to instruction in farm management. Table 12 shows, however, there was not a strong statistical relationship between years of instruction and total scores.

Table 12

SUMMARY OF CURVILINEAR REGRESSION ANALYSES OF THE RELATIONSHIP BETWEEN TOTAL ATTITUDE SCORES AND INSTRUCTION

Subsample	Degree Polynominal	Level of Significance	R
Education			
All farm families	1	.25	.054
Farm management families	NS		
Families in well-organized programs	2	.05	.126
Farming			
All farm families	NS		
Farm management families	3	.10	.090
Families in well-organized programs	NS		

Figure 19 illustrates the only statistically significant finding concerning total scores. The diminishing returns effect is again suggested with the most positive education attitude score reached at the fourth or fifth year of instruction. There is a rapid rate drop after the peak to a low of approximately 120.5 by the tenth year of instruction.

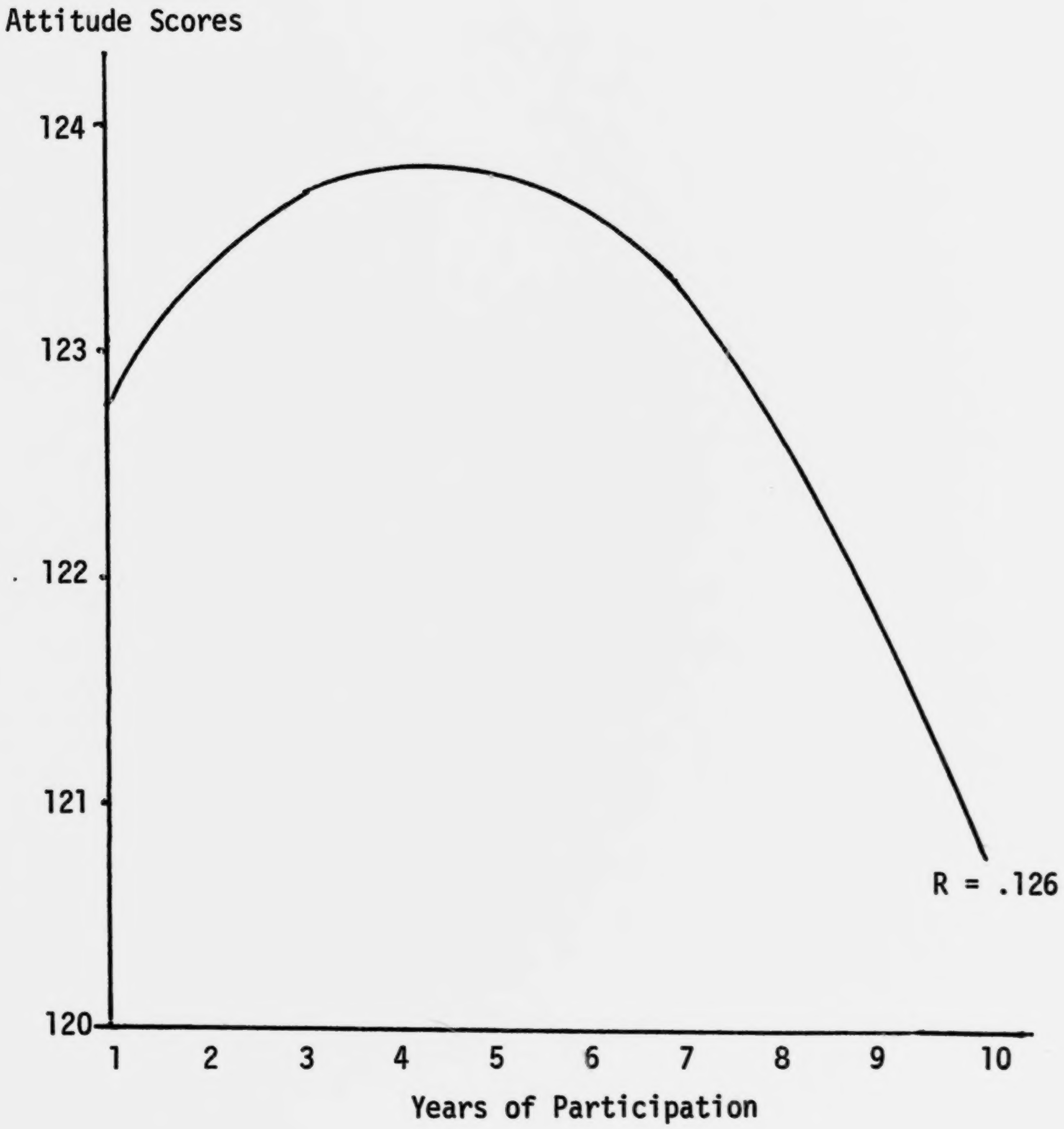

Figure 19. RELATIONSHIP BETWEEN TOTAL EDUCATION SCORES AND INSTRUCTION FOR FAMILIES IN WELL-ORGANIZED PROGRAMS OF FARM BUSINESS MANAGEMENT EDUCATION.

The second specific question of the study was: what is the relationship between attitudes and income? Although it would have been possible to relate attitude scores to some other measure of farm income, labor earnings shows the return for farmers that is most equivalent to salaries and wages.

Cluster Analysis

Table 13 shows a summary of the instruction-income relationships for the cluster attitude scores for both the education and farming scale. The best fitting regression lines in all three statistically significant subscales were of different degrees and thus had different shapes.

Table 13

SUMMARY OF CURVILINEAR REGRESSION ANALYSES OF THE RELATIONSHIP BETWEEN CLUSTER ANALYSIS SUBSCALE SCORES AND INCOME.

Subscale		Degree Polynominal*	R
Farm Management			
Husbands			
Education	I	NS	
	II	2	.124
	III	NS	
	IV	NS	
Farming	I	NS	
	II	4	.177
	III	1	.117
	IV	NS	

* Only equations significant at the .05 level are presented.

Figure 20 shows again a diminishing returns curve, but in this case the interpretation is somewhat more complicated. Those farm management husbands with general education value attitudes of eight or ten had the highest income. The extremely low or high attitude scores tended to be associated with lower incomes.

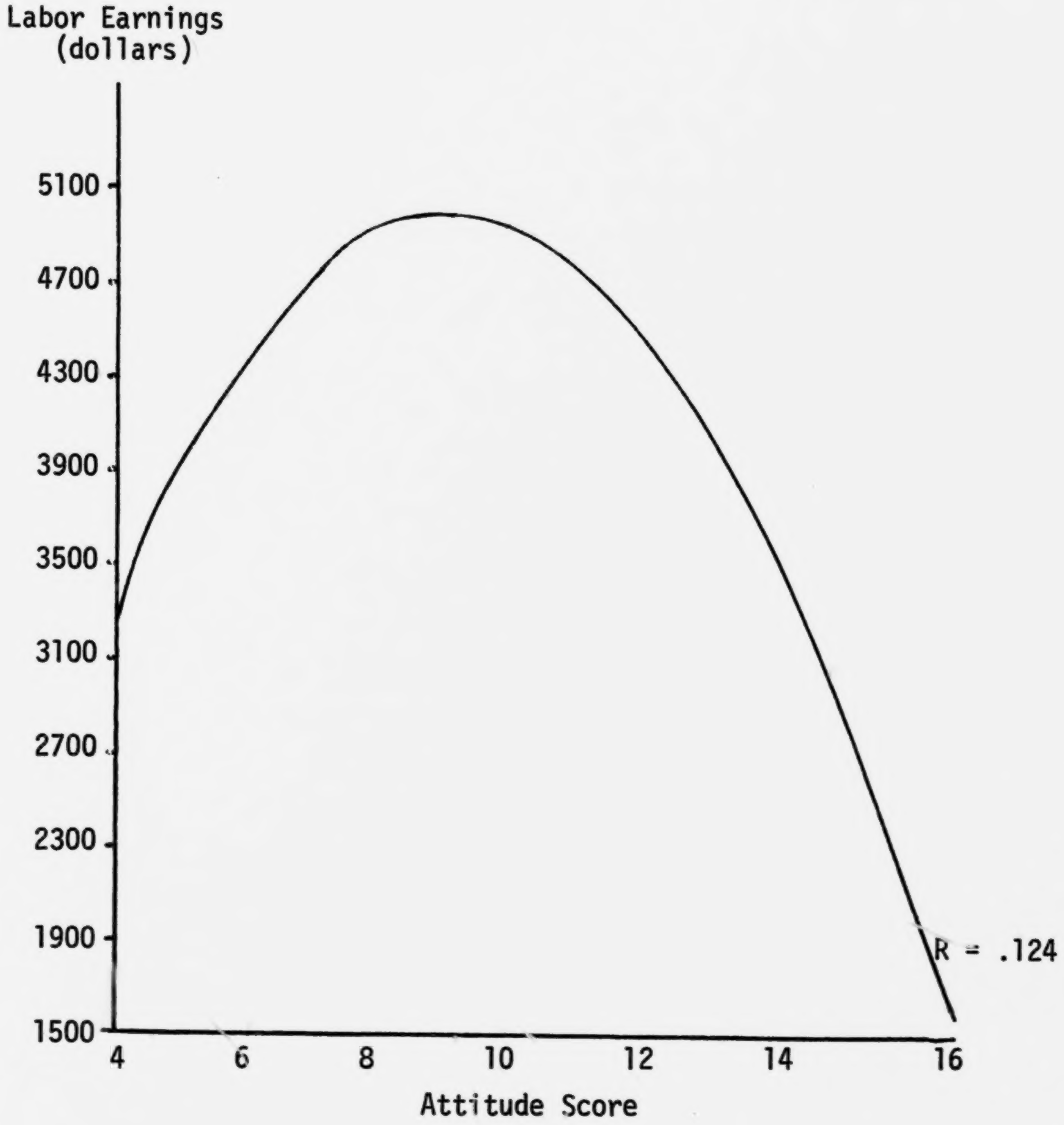

Figure 20. RELATIONSHIP BETWEEN EDUCATION SUBSCALE II* ATTITUDE SCORES AND INCOME FOR ALL FARM MANAGEMENT HUSBANDS.

* From the cluster analysis of item responses.

There is a negative relationship illustrated in Figure 21 between rational, independent attitudes toward farming and farm income. The higher incomes were associated with the lower attitude scores. There was some positive relationship between income and scores above 16, but that diminished above an attitude score of 20.

The positive linear regression line in Figure 22 suggests that more positive attitudes about innovativeness are related to higher incomes. There is nearly a $550 increase for each 2 points on the innovativeness scale.

Factor Analysis

Table 14 reports no attitude-income relationships significant beyond the .05 level when factor analysis attitude subscales were the dependent variables. When income was the dependent variable and attitude subscale scores were the predictors, there was no significant relationship.

Table 14

RELATIONSHIP BETWEEN ATTITUDE SUBSCALE SCORES AND LABOR EARNINGS BASED ON FACTOR ANALYSIS SUBSCALES

Subsample	Subscale	Degree Polynomial	Level of Significance	R
Income independent, attitudes dependent				
All Farm Management Husbands				
Education	I	1	.25	.06
	II	2	.25	.09
	III		NS	
Farming	I	3	.25	.10
	II	1	.10	.069
	III		NS	
Attitudes independent, income dependent				
All Farm Management Husbands				
Education	I	3	.25	.11
	II		NS	
	III		NS	
Farming	I	4	.10	.14
	II		NS	
	III		NS	

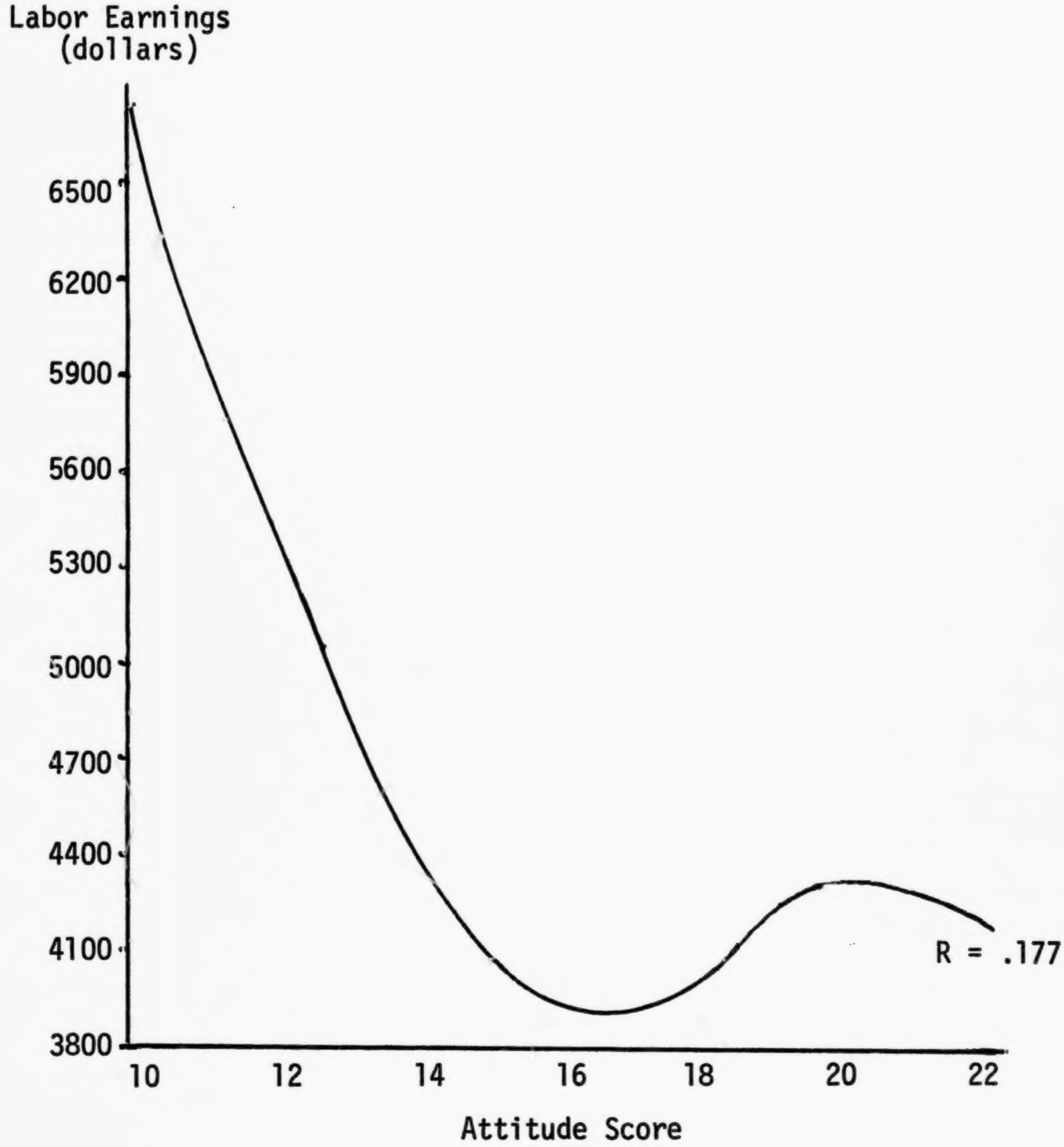

Figure 21. RELATIONSHIP BETWEEN FARMING SUBSCALE II* ATTITUDE SCORES AND INCOME FOR FARM MANAGEMENT HUSBANDS.

* From the cluster analysis of item responses.

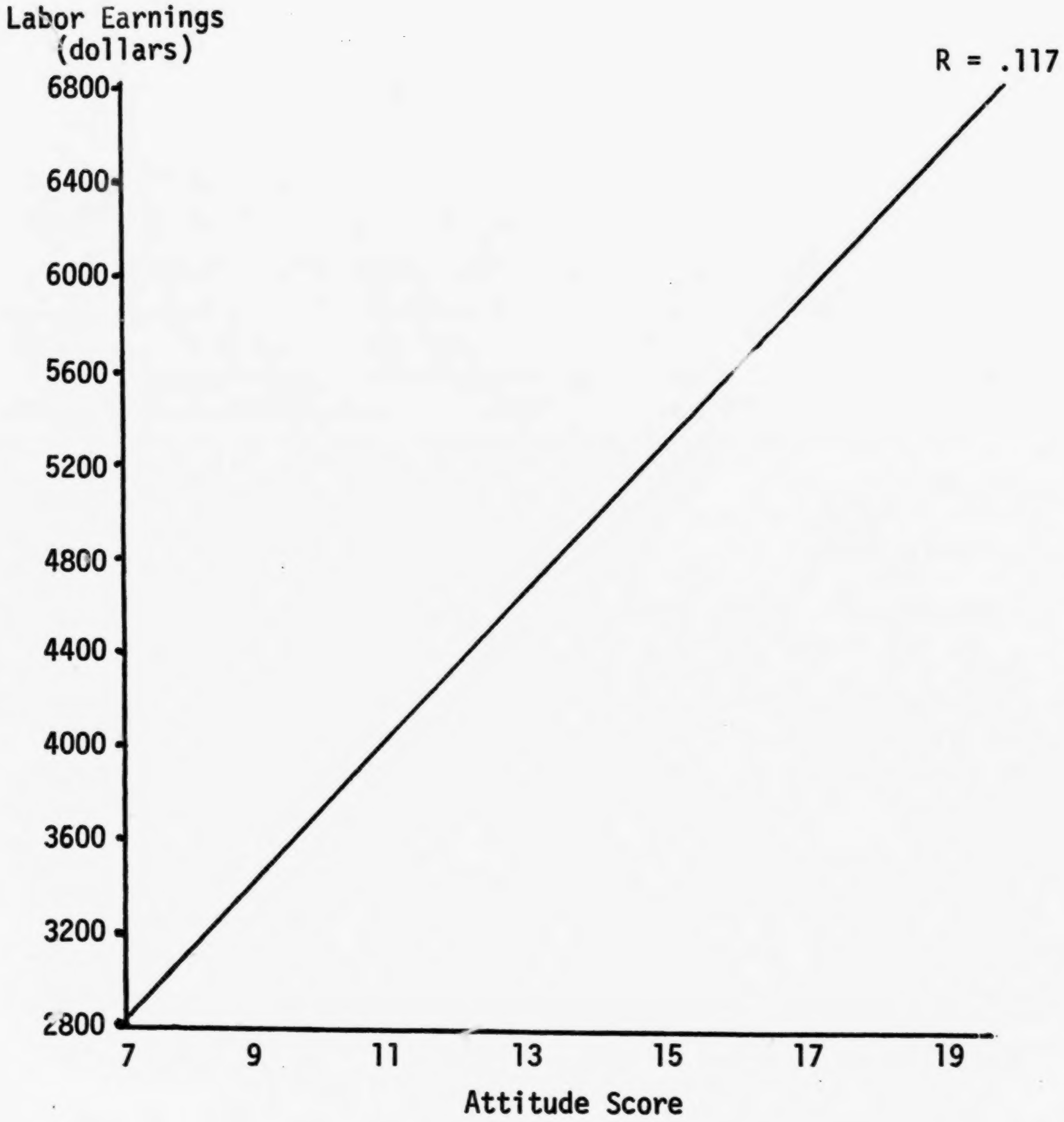

Figure 22. RELATIONSHIP BETWEEN FARMING SUBSCALE III* ATTITUDE SCORES AND INCOME FOR FARM MANAGEMENT HUSBANDS.

* From the cluster analysis of item responses.

Total Scores

As Table 15 shows, there were no significant attitude-income relationships between total attitude scores and income. The only subsamples that approached significance were those which included only farm management husbands.

Table 15

SUMMARY OF CURVILINEAR REGRESSION ANALYSES OF THE RELATIONSHIP BETWEEN TOTAL ATTITUDE SCORES AND LABOR EARNINGS

Subsample	Degree Polynomial	Level of Significance	R
Attitudes dependent, income independent			
Education			
All husbands in farm management		NS	
All husbands participating in well-organized programs	1	NS	.02
All husbands participating in other than well-organized programs	1	NS	.01
Farming			
All husbands in farm management	7	.10	.14
All husbands participating in well-organized programs	1	NS	.04
All husbands participating in other than well-organized programs	1	NS	.04
Income dependent, attitudes independent			
Education			
All husbands in farm management	3	.25	.11
Farming			
All husbands in farm management	3	.10	.13

To determine if income and attitudes were similarly related to instruction, Figure 23 shows the relationship between income and instruction for all farm management families. The best fitting line was a straight line starting at approximately $3300 and reaching nearly $5800 at the end of ten years. This represented a rate of increase of approximately $250 per year. The multiple correlation coefficient was .146.

Farm families in well-organized programs of farm management instruction showed a different relationship between income and instruction. Figure 24 reports a diminishing returns effect with the estimated first year value of $2200 increasing but at a decreasing rate to the seventh year when the expected income was about $5700. After the eighth year of instruction the expected income dropped with each year of instruction to year ten when the value was somewhat less than $5000. The correlation coefficient was .201.*

The third specific question in the study was: what is the relationship between instructor and student attitudes? Table 16 reports the student-instructor attitude correlations for both the education and farming scale. None of the correlations were statistically significant.

Table 16

RELATIONSHIP BETWEEN INSTRUCTOR AND STUDENT TOTAL ATTITUDE SCORES[a]

Attitude Scale	Correlation Coefficients Instructor-Husband	 Instructor-Wife
	n = 283	n = 251
Education	.018	.035
Farming	.061	.035

[a] Based upon farm family and instructor scores of those enrolled in 1965, 1966, or 1967.

To see if the nature of the education input affected instructor-student attitude score relationships, Table 17 shows the two subsamples: families in well-organized and other than well-organized programs. There are positive correlations within the well-organized group and negative correlations in the other. The instructor-wives

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* The differences between these findings and those of another farm management study in Minnesota are discussed in Chapter VI.

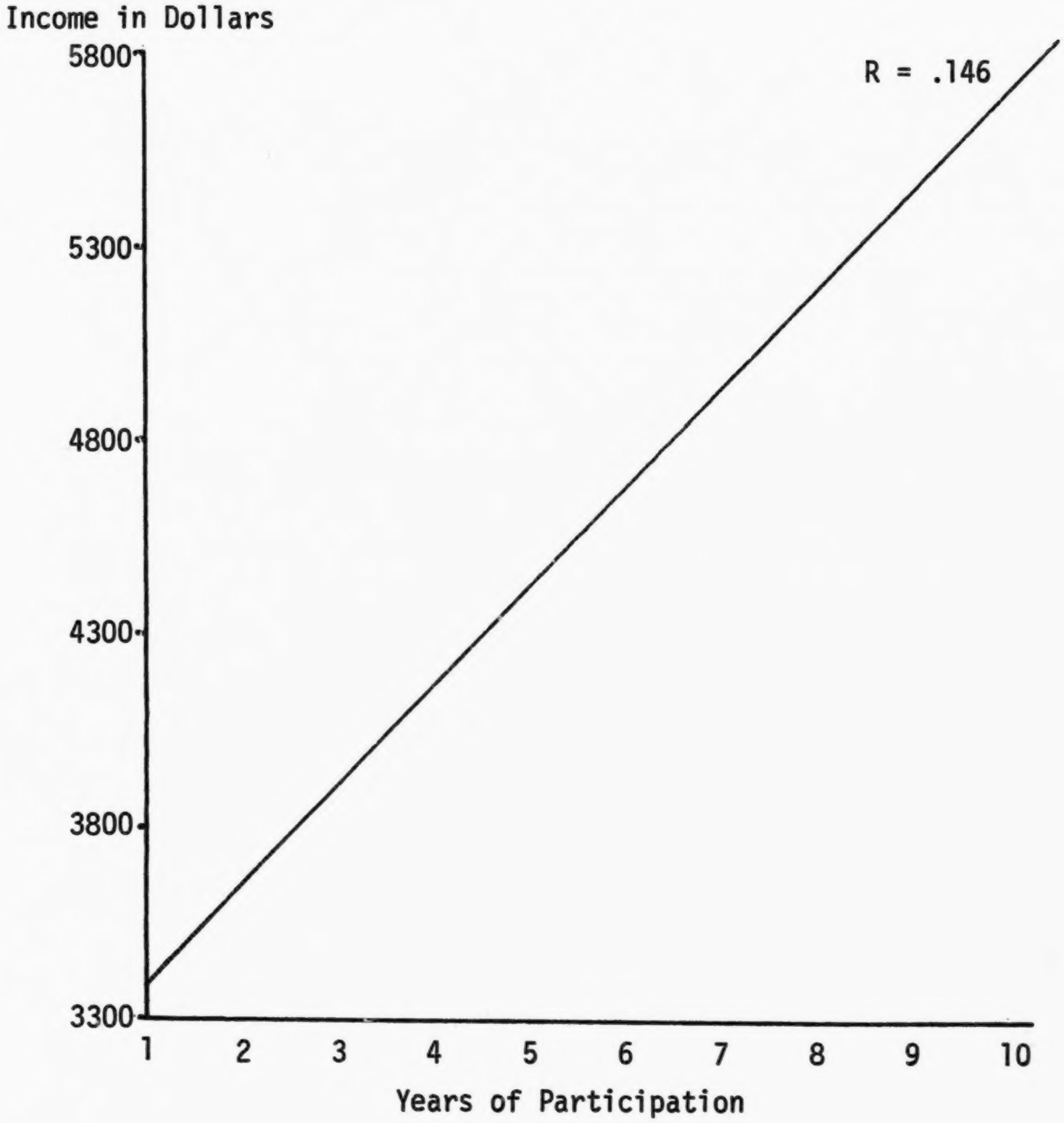

Figure 23. RELATIONSHIP BETWEEN INCOME AND INSTRUCTION FOR ALL FARM MANAGEMENT FAMILIES[a]

[a] Based upon farm income data for all families enrolled in farm management programs in 1965, 1966 or 1967, where there were 43 farms with single husband or wife responses.

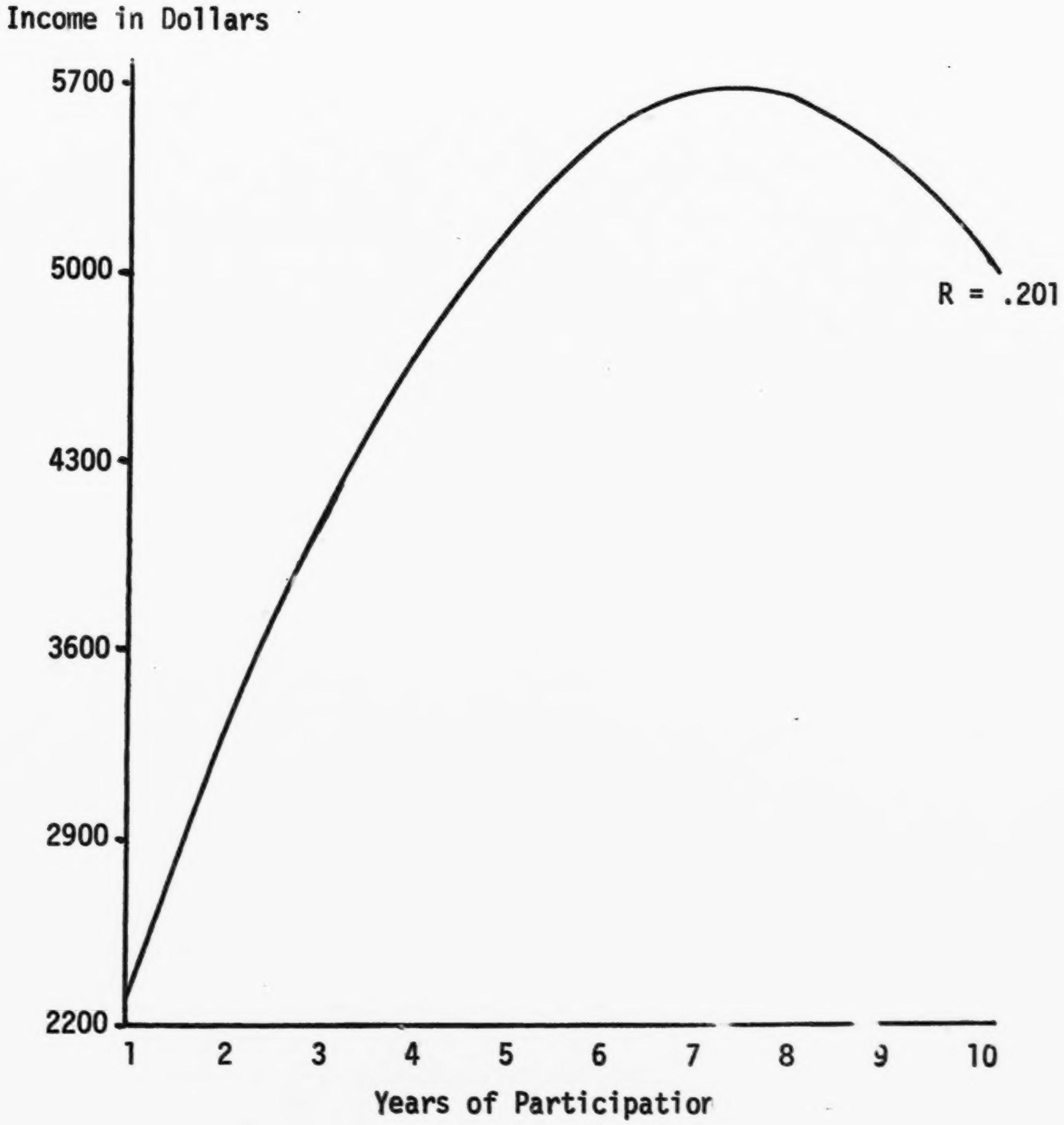

Figure 24. RELATIONSHIP BETWEEN INCOME AND INSTRUCTION FOR ALL FAMILIES IN WELL-ORGANIZED PROGRAMS[a]

correlation is stronger in the well-organized group and the instructor-husband correlation is stronger in the other group (although a negative relation).

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[a] Based upon farm income data for all families enrolled in well-organized programs with full-time instructors in 1965, 1966 or 1967, where there were 43 farms with single husband or wife responses.

Table 17

LINEAR RELATIONSHIP BETWEEN INSTRUCTOR AND STUDENT ATTITUDES TOWARD EDUCATION AND FARMING[a]

Subsample		Correlation Coefficients Education	 Farming
		r	r
All families in well-organized programs	Husbands	.04	.09
	Wives	.12	.11
All farm families in other than well-organized programs	Husbands	-.05	-.02
	Wives	-.01	-.01

[a] Based upon farm family and instructor scores of those enrolled in 1965, 1966 or 1967.

The linear relationships between instructor and student attitudes toward education and farming according to years of instruction are in Table 18. In general, the correlations are higher and positive for the first years of instruction, negative for the middle years, and positive again for the later years. Excluding the last category, ten or more years of instruction, the attitude scores become less variable with instruction: The standard deviations are smaller for the eighth and ninth years. In general the student-instructor attitude correlation is stronger in the well-organized programs.

Table 18

LINEAR RELATIONSHIP BETWEEN INSTRUCTOR AND STUDENT ATTITUDES ACCORDING TO YEARS OF INSTRUCTION[a]

Subsample	Years of Instruction		Correlation Coefficients - Students vs. Instructor			
			Education		Farming	
			Husbands	Wives	Husbands	Wives
All farm families in farm management education programs	1	r	.18	.28	.07	.36
		(SD)	(4.72)	(4.11)	(5.76)	(13.89)
	2		.30	-.03	.21	-.10
			(4.42)	(12.84)	(9.35)	(16.66)
	3		-.24	-.18	.04	.38
			(5.21)	(6.22)	(7.55)	(8.63)
	4		-.27	.02	.03	-.13
			(4.85)	(4.68)	(5.21)	(6.42)
	5		.15	-.06	-.19	-.28
			(6.61)	(4.82)	(5.98)	(4.96)
	6		-.09	-.16	.03	-.05
			(4.23)	(3.85)	(4.82)	(4.27)
	7		-.25		.37	.51
			(5.92)		(5.93)	(6.34)
	8		.30		.13	.03
			(4.52)		(6.81)	(5.56)
	9		-.09		.60	.11
			(2.91)		(4.01)	(13.75)
	10+		.05		-.11	.06
			(6.81)		(11.41)	(16.08)
All farm families in well-organized programs of farm management instruction	1	r	.92	.70	-.12	.52
		(SD)	(4.99)	(4.06)	(5.68)	(7.73)
	2		.12	-.15	.46	-.60
			(4.59)	(4.15)	(10.34)	(6.35)
	3		-.19	.30	-.43	.34
			(5.41)	(3.96)	(6.59)	(5.55)
	4		-.32	-.15	.01	-.23
			(5.47)	(5.31)	(5.92)	(7.44)
	5		.13	-.18	-.34	-.23
			(8.56)	(3.54)	(6.60)	(5.20)
	6		-.17	-.22	.01	.07
			(4.49)	(4.26)	(4.55)	(4.34)
	7		-.26	-.06	.29	.59
			(6.52)	(5.42)	(5.71)	(6.83)
	8		.36	.72	.19	.02
			(4.65)	(4.01)	(6.73)	(5.11)

Table 18 (Continued)

Subsample	Years of Instruction	Correlation Coefficients - Students vs. Instruction Education		Farming	
		Husbands	Wives	Husbands	Wives
	9	.03 (3.35)	.15 (4.41)	.59 (4.58)	.18 (15.98)
	10+	.25 (7.76)	.35 (7.10)	-.20 (12.66)	-.05 (20.44)

[a] Based upon farm family and instructor scores of those enrolled in 1965, 1966 or 1967.

Summary

There was little practical difference between respondents and nonrespondents on measures related to farm business size and farm income. Farm families interviewed in person were very similar on all measures in comparison with all other farm families in the study. There were few major differences between farm management families and farm families drawn randomly from ASC lists and who had no farm management instruction: the distributions of age, education and number of organization memberships were quite similar. Based on these pieces of evidence, it is reasonable to generalize the results of the study to all farm families in Minnesota.

The multiple correlation coefficient did not indicate a strong relationship between attitude scores and years of farm management instruction. There were, however, statistically significant and consistent relationships between instruction and attitude scores. The cluster analysis of the items provided eight subscales: four in the farming attitude dimension and four which related to education attitudes. There was generally an improved attitude with increments of farm management instruction, but in many cases there was a diminishing marginal return. At about the sixth or seventh year of instruction there was a decline inthe rate of gain and subsequently a period of negative marginal changes.

The relationships using attitude scores on subscales derived from factor analysis were not as strong or as consistent as the subscales derived from cluster analysis. Similar conclusions are appropriate for the relationship between total attitude scores on the education and farming scales and instruction: the relationships were not strong and were not consistent across subsamples of the target populations.

There were several statistically significant relationships between attitude subscale scores, based on cluster analyses, and farm income. One showed that average scores on the subscales were related to higher incomes. Another relationship was more complex, but in general low scores were associated with higher income. The third significant relationship showed a positive linear association between attitudes toward innovation and farm income.

None of the regression equations relating income and attitude subscales derived from factor analysis were significant when either income or attitudes were the dependent variable. Likewise, the total education and farming scores showed no significant relationship to farm income.

The relationship between instruction and income was positive and linear for all farm families in farm management. The well-organized farm management programs showed a diminishing marginal returns effect for additional education after the seventh year of instruction.

There was no clear relationship between instructor and student attitude scores using as a basis all husbands and wives in farm management. There was a difference, however, in the student-instructor total attitude score relationship depending on whether students were in well-organized programs. Families in other than well-organized programs had scores negatively related to instructor scores. There were no definite trends of differences in correlation coefficients in investigating student-instructor attitude score relationships according to the years of instruction.

This study did not find evidence that years of instruction in farm management can accurately predict attitudes or that attitudes could accurately predict farm income.

Only a small proportion of the variation in attitudes could be accounted for by knowing the number of years of farm management instruction. It is significant, however, that this study found even a small relationship between instruction and attitudes: there have been few studies which have shown any long-time attitude response to instruction.

CHAPTER V

SUMMARY AND CONCLUSIONS

The main concern of this study was to investigate the relationships between instruction in farm business management and attitudes toward education and farming.

The Plan of the Investigation. Although the tools of economic analysis have in recent years provided a basis for investigating the investment effects of education, few have attempted to measure non-economic returns. The farm families in a farm business management education program in Minnesota provided a group of subjects for which there was both detailed economic information and an incremental input of education.

The first step in the investigation was to develop a paper and pencil test for measuring farm family attitudes. A preliminary list of approximately 300 items was presented to a trial group and shortened on the basis of item analysis to 41 items in the education scale and 49 items in the farming scale. The instrument reached four target populations by mail in December, 1968. The farm families involved had experience with farm management instruction ranging from 0 to 10 or more years. The item responses within each scale were cluster analyzed and thereby arranged into groups of items all of which seemed to measure a common dimension. There were four education subscales and four farming subscales. Item response weights were reassigned to maximize internal consistency. The sum of individual scores provided the basis for the analysis. Factor analysis also provided a way to inspect the data: it provided three education and three farming subscales.

The major statistical technique useful in analyzing the relationships between attitude scores and instruction was curvilinear regression. This procedure determined the shape of a best fitting line through points and estimated its accuracy. The same technique was useful in relating attitude scores to income.

The other statistical technique was linear correlation. The instructor and student attitude scores were the data input to determine to what degree the two sets of scores were related.

The Findings and Conclusions of the Investigation

The results of the study should generalize reasonably well to all farm families in Minnesota because of the similarities among those who did and did not respond to the questionnaire and because of the similarities between farm families in farm management programs and farm families with no farm management training. All results, however, need to be tempered with two limitations: (1) the descriptive, not predictive nature of the study, and (2) the accuracy of the instrument.

The first specific question of the study was: what is the relationship between attitudes and farm management instruction? There was not a strong statistical relationship between attitude scores and instruction according to the multiple correlation coefficient. There were, however, significant and consistent findings. There were eight clusters or subscales with four within each major scale: education and farming. There was a general improvement in terms of a more positive attitude score related to more years of instruction in farm management, but in several instances there was a strong suggestion of a diminishing returns effect. Neither the factor analysis subscales nor the total education and farming scale scores provided evidence of strong or consistent relationships across various divisions of the target populations.

There were several statistically significant relationships between attitude subscale scores, based on cluster analysis, and farm income. In general there was a positive relationship: more years of farm management instruction were associated with higher levels of farm income as measured by labor earnings. None of the regression equations relating income and attitude scores from factor analysis subscales or total education or farming scores showed statistical significance.

The income response to instruction in farm management was found to be positive and of the same general degree of accuracy as the attitude response. There was a difference, however, between the shape of the performance curves in this study and those from a previous study of farm management in Minnesota (2). Both the linear and the diminishing returns findings in this study at first seem at variance with the general findings of the other study. The methods of analysis in the other study, however, were not the same as the procedures in this investigation. The Swanson, Persons, Kittleson and Leske study, although it used essentially the same data, used an indexing procedure to reduce the extreme variability in yearly farm income. With the extreme variation being tempered by the indexing procedure, the instruction-income relationship showed a regression line much like a learning curve.

The conclusions in this study depend on raw data: the curvilinear relationships between individual farm incomes and years of instruction in farm business management. Because of these differences in methodology, the findings are neither contradictory nor do they invalidate each other: they are two ways of investigating the same problem.

There was no clear relationship between instructor and student attitude scores using as a basis for comparison all husbands and wives in farm management. There was a difference, however, in the relationship between student and instructor total attitude scores depending on the quality of the instruction program. Families in other than well-organized programs had scores negatively related to instructor scores; well-organized program student and instructor attitude scores were positively related. There were no definite trends of differences in correlation coefficients in investigating student and instructor attitude score relationships according to the number of years of instruction.

Because the results of the investigation seemed promising, suggestions for revising the attitude instrument appear in the appendix. Many of the difficulties in the original inventory are there clarified and the revised paper and pencil measures could be used for farm families anywhere in the United States.

Implications. For a long time educators have claimed both economic and social benefits accrue to students in instruction programs. It is only in relatively recent years that researchers have used economic tools to measure the monetary returns to investments in education. Non-economic or social benefits have assumed the role of desirable side effects and little research has attempted to quantify psychological returns. This study has shown that attitudes toward education and farming are related to instruction in farm business management. Although the differences in attitudes were not as great as hoped for, it is extremely important that this research has shown attitudes are related to education.

Since the differences in attitudes were very slight, if adult vocational agriculture instructors want to claim significantly improved attitudes as one of the products of their education program, there is need for a revision in methods, subject matter, or both. Although there was no specific effort on the part of agriculture instructors to teach attitudes, there is a general public notion that education should and does affect attitudes. This type of attitudinal research in other education programs might well point out the same fact: if social benefits such as attitude changes are a desirable end product, there must be changes in the education process.

Since not all sons of farmers can nor will become farmers, a need exists for counseling young men interested in production agriculture. A statistically developed pattern of attitudes of financially successful farmers could provide a means of comparison for farm boys much as the Strong Interest Blank helps young people compare their interest profiles to people successful in each of several occupations.

If adult education for farm families influences the degree to which capable rural youth seek education beyond high school, the benefits of instruction accrue not only to the participants and their children, but to society as a whole.

This research verified the findings in another study of the economic returns to investments in Minnesota farm business management. It substantiates Cvancara's hypothesis of diminishing marginal returns (1) although the diminishing marginal return in this study occurred after more years of instruction and involved only families in well-organized programs.

Although there is much to be learned about entrepreneurship, the results of this study suggest that both income and attitudes respond in a similar way and to a similar degree to education inputs. The findings not only suggest that attitudes are a dimension of entrepreneurship but that if income is the criterion, the attitude scales measured a component of managerial ability. Students in farm business management seem to be benefiting from instruction in the art and science of achieving an optimum mix of land, labor and capital for the purposes of profit-making.

Suggestions for Further Research. This study was cross-sectional in that it measured farm family attitudes at one point in time. It would be interesting to try an alternative procedure and use a pre-instruction, post-instruction design to see if there would be similar results.

There were several questions which this research uncovered but did not attempt to answer:

1. Is there a pattern of attitudes which could discriminate between financially more successful and less successful farmers?
2. How useful are attitude scores in combination with other income determinants in predicting financial success in farming?
3. Is there an attitude change during the first three years of intensive farm management instruction?
4. Are there other attitudes which are important measurable components of entrepreneurial behavior of farmers?

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APPENDIX

UNIVERSITY OF Minnesota

COLLEGE OF EDUCATION
DEPARTMENT OF AGRICULTURAL EDUCATION • ST. PAUL, MINNESOTA 55101
(612) 373-1557

I think farm families receive more than economic benefits from a farm management program. I am studying changes in farmers' attitudes toward education, farming as a business, and risk-taking and I need your help. I have selected a random sample of farmers who were in the farm management program in your school. I wonder if you would fill in the missing blanks on the enclosed list of names?

Once I get the mailing addresses, I will contact all the farm families on the list by mail and ask some to fill out a questionnaire. I will ask other farmers on the list if I could come to their homes and visit with them atwhich time I would give them the same questionnaire. The questionnaire will be a list of statements to which farmers and their wives can respond on a scale from strongly disagree to strongly agree. I am sending you a list of a few statements to be used also, so that you will have an idea of the kinds of questions that will be asked.

I'm sure nothing I will ask will embarrass you or the farm management program at your school. I would appreciate your cooperation.

Thank you very much.

Sincerely yours,

Howard Kittleson

Enclosure

UNIVERSITY OF Minnesota

COLLEGE OF EDUCATION
DEPARTMENT OF AGRICULTURAL EDUCATION · ST. PAUL, MINNESOTA 55101

December 27, 1968

I need your help in seeing what farm families think about the subjects: education and farming. Would you fill out the enclosed questionnaire? I think you and, if you're married, your wife will enjoy reacting to a list of statements which I hope will tell me something about how you feel about some aspects of education and farming. Since you don't need to sign your name, you'll be able to circle "far-out" answers whenever you feel strongly about the statement.

I hope both you and your wife will complete a questionnaire (separately, please-even if you do both make the farm decisions). I don't think the questionnaire will take you long and it might even be fun. Please mail the questionnaires back in the enclosed stamped envelope. I'd appreciate it if you could return the questionnaire within two weeks.

Thank you very much.

Sincerely yours,

Howard Kittleson

UNIVERSITY OF Minnesota

COLLEGE OF EDUCATION
DEPARTMENT OF AGRICULTURAL EDUCATION • ST. PAUL, MINNESOTA 55101

December 27, 1968

I need your help in seeing what farm families think about two subjects: education and farming. If you're willing to cooperate, I'd like to interview you and, if you're married, your wife at your farm. I think you'll enjoy reacting to a list of statements which I hope will tell me how you feel about some aspects of education and farming. Of course, I won't use your name in reporting any information that you give me. That way you can feel free to express your views.

I was born and raised on a farm, so I know a farmer's work is never done, but I would appreciate about an hour of your time. I need to visit you in person because I can explain better what I'm doing, and I'll be able to tell how you really feel.

If you're willing to let me come and visit you, could you send back the enclosed post card after marking ten different times I could come to your farm? I'll call you after I have my schedule figured out to confirm a time. I'd appreciate it if you could return the post card within one week.

Thank you very much.

Sincerely yours,

Howard Kittleson

UNIVERSITY OF Minnesota

COLLEGE OF EDUCATION
DEPARTMENT OF AGRICULTURAL EDUCATION · ST. PAUL, MINNESOTA 55101

February 12, 1969

I'm going to ask for your help again. Sometime around the last of December I wrote asking you if I could come visit about attitudes toward education and farming. Thanks to the good many of you who said I could, but I just couldn't visit all of you.

Now I'm going to ask all of you to help in a different way. Would you fill out the enclosed questionnaire? I think you and, if you're married, your wife will enjoy reacting to a list of statements which I hope will tell me something about how you feel about some aspects of education and farming. Since you don't need to sign your name, you'll be able to circle "far-out" answers whenever you feel strongly about the statement.

I hope both you and your wife will complete a questionnaire (separately, please--even if you do both make the farm decisions). I don't think the questionnaire will take you long and it might even be fun. Please mail the questionnaire back in the enclosed stamped envelope. I'd appreciate it if you could return the questionnaires within one week.

Thanks.

Sincerely yours,

Howard Kittleson

UNIVERSITY OF Minnesota

COLLEGE OF EDUCATION
DEPARTMENT OF AGRICULTURAL EDUCATION • ST. PAUL, MINNESOTA 55101

February 25, 1969

Earlier this winter you were kind enough to help me study attitudes toward education and farming: now I need your help again. I need to see if people will fill out the questionnaires pretty much the same way they did the first time. (This isn't to check your memory or honesty - it is to see how good the questionnaire is).

Would you find time to complete the questionnaires once more? I'd appreciate getting them back within one week.

Thanks.

Sincerely yours,

Howard Kittleson

FARM FAMILY OPINION INVENTORY

WIFE VERSION

DIRECTIONS: Please read each statement and use the code numbers to show how you feel about the statement. There are no right or wrong answers. Please work as fast as you can, but read each item carefully. Please answer **every item.** Please mail the questionnaire to me in the enclosed envelope.

Use the following code numbers to show your responses:

Write 1 if you **strongly agree**
Write 2 if you **agree**
Write 3 if you are **undecided**
Write 4 if you **disagree**
Write 5 if you **strongly disagree**

Example: a. 2 Agriculture is more than farming.

PART I

1. ___ The more education a man has, the better he is able to enjoy life.

2. ___ I am very satisfied with the school in in my community.

3. ___ Consolidation is a good idea because larger schools offer a greater variety of subjects.

4. ___ The buildings in our local school system are in need of improvement.

5. ___ Tax money should be used to pay the tuition for college students who can't afford to go to college otherwise.

6. ___ The costs of higher education should be paid by students according to the ability of the student and his family to pay.

7. ___ Education goals should be determined by children's interests.

8. ___ Consolidation is a poor idea because classes get too large — less personal attention.

9 ___ I respect a man with a college education.

10. ___ College education should be free to all who want it and can qualify.

11. ___ More adult education should be available to farmers.

12. ___ A college education for a farmer costs more than it's worth.

13. ___ Teachers are definitely underpaid.

14. ___ School training is of little help in facing the real problems of life.

15. ___ Consolidation is a poor idea because small schools provide better education.

16. ___ Education is to blame for burning of of draft cards and university riots.

17. ___ High schools should concentrate on preparing people for college.

18. ___ Good adult farmer classes are worth many days, weeks, or years of actual farm experience.

19. ___ Parents should be willing to let their children go into debt for more education.

PART I — continued

Use the following code numbers to show your responses:

Write 1 if you **strongly agree**
Write 2 if you **agree**
Write 3 if you are **undecided**
Write 4 if you **disagree**
Write 5 if you **strongly disagree**

---

20. ___ All people, whether or not they have children in school, should be taxed for education.

21. ___ Education is a source of new social ideas.

22. ___ No one has an excuse for being ignorant.

23. ___ It would be a poor idea to join together school districts so none would have fewer than 1500 students.

24. ___ Public schools provide education for persons of all ages who need and want training.

25. ___ Well-educated youngsters get good jobs and leave the local community.

26. ___ Education is good even if it only helps parents to help their children with homework.

27. ___ Farmers who have gone to college seem to enjoy life more.

28. ___ Education should be compulsory through 14 grades.

29. ___ Federal aid to education should be avoided.

30. ___ Public school teachers are the most important people in the community.

31. ___ I wish I could have learned more about math and science when I went to school.

32. ___ Young people are getting too much education.

33. ___ I wish I could have gone to school for more years than I did.

34. ___ Our schools encourage an individual to think for himself.

35. ___ The most important part of a boy's education should be obtained through hard work at many tasks around the farm.

36. ___ A farmer can get all the information he needs from farm publications and county agents.

37. ___ Parents should be willing to go into debt so their children could have more education.

38. ___ Bigger schools have better teachers and books and more money to keep up with the recent trends in education.

39. ___ Not finishing high school is a great handicap.

40. ___ Consolidation is a good idea because it is more economical — better facilities at less cost.

41. ___ Consolidation is a good idea because larger schools attract better teachers.

PART II

Use the following code numbers to show your responses:

Write 1 if you **strongly agree**
Write 2 if you **agree**
Write 3 if you are **undecided**
Write 4 if you **disagree**
Write 5 if you **strongly disagree**

---

1. ___ Young farmers should have a goal of owning their own land someday.
2. ___ Bankers are interested in receiving the highest possible interest rates, regardless of the effect on farmers.
3. ___ I like to try new farming ideas.
4. ___ Betting only on good chances is generally a good policy.
5. ___ You've got to work year 'round in farming.
6. ___ New ideas in farming have to be tempered with the old.
7. ___ The farmer is more likely to enjoy his work than are most city people.
8. ___ It takes more management ability to operate a farm than any business in the city.
9. ___ Credit should be used as a part of the operating funds in the farm business.
10. ___ Too much farm production has caused low farm incomes.
11. ___ The only real wealth is produced by the farmer.
12. ___ A lot of ambition could offset the need to use borrowed money in in farming.
13. ___ A farmer needs to specialize to stay in business.
14. ___ Using credit releases cash that can be spent on other things.
15. ___ We find it best not to be the first to try a new farming method.
16. ___ Prices should be left free without controls to guide farm production.
17. ___ There is not enough research in agriculture.
18. ___ Farmers who don't use new ideas don't stay in farming very long.
19. ___ Farmers have had too little advertising of their products, thus causing low farm incomes.
20. ___ Borrowing puts a farmer at the mercy of the lender.
21. ___ Farmers should plan the next year's farming operation years ahead of time.
22. ___ A farmer should be conservative about spending.
23. ___ A farmer should be aggressive and not always bet on a sure thing.
24. ___ Farming decisions should be based mostly on experience.
25. ___ Because some farmers can raise crops for a lot less cost per acre, some families are being forced out of farming.
26. ___ Controlling a lot of land is important in the competitive business of farming.
27. ___ I don't like to be in debt.
28. ___ A farmer should exchange work with a neighbor instead of hiring things done.

PART II — continued

Use the following code numbers to show your responses:

Write **1** if you **strongly agree**
Write **2** if you **agree**
Write **3** if you are **undecided**
Write **4** if you **disagree**
Write **5** if you **strongly disagree**

---

29. ___ The less government in business activities, the better.

30. ___ An ideal farm is one on which all the work can be done by the farmer and his family.

31. ___ Farming is important to me because of working the soil, living close to nature, and being away from the fast pace of city life.

32. ___ Once out of debt, a farmer should try to stay out.

33. ___ Being your own boss is the best part of farming.

34. ___ Good hard work and lots of it is the only way to be a successful farmer.

35. ___ Farmers should use credit only when absolutely necessary.

36. ___ Farming can't be done without records.

37. ___ Most articles in farm magazines are impractical.

38. ___ The land is the foundation of the family.

39. ___ Farmers should use some of their savings to expand their farm operation.

40. ___ Too much over-all production due to high price supports causes low farm incomes.

41. ___ Farmers should be careful about using new methods and products until they have seen them work on other farms.

42. ___ I think I'm among the first to adopt a new farm practice.

43. ___ Government should help beginning industries get started.

44. ___ Current high cost of production items has caused low farm income.

45. ___ The most successful farmer is one who is the best leader in the community.

46. ___ Farm prices being set by private marketing organizations has caused low farm incomes.

47. ___ The most successful farmer is one who has interests and rewards that don't depend on income.

48. ___ Farm management education helps a farmer do a better job of farming.

49. ___ Instead of depending on savings, a farmer should use credit in expanding and operating his farm.

PART III

Age_____ Years of schooling_____ Number of children (if married)_____ Member of_____ organizations (Number of farm, religious, or civic groups)

ATTITUDE INVENTORY ITEMS AND INITIAL RESPONSE WEIGHTS FOR EDUCATION SCALE

	Item	Response Weights				
1.	The more education a man has, the better he is able to enjoy life.	4	3	3	3	2
2.	I am very satisfied with the school in my community.	3	3	3	3	3
3.	Consolidation is a good idea because larger schools offer a greater variety of subjects.	4	3	3	3	2
4.	The buildings in our local school system are in need of improvement.	4	3	3	3	3
5.	Tax money should be used to pay the tuition for college students who can't afford to go to college otherwise.	4	3	3	3	3
6.	The costs of higher education should be paid by students according to the ability of the student and his family to pay.	3	3	3	3	3
7.	Education goals should be determined by children's interests.	3	3	3	3	3
8.	Consolidation is a poor idea because classes get too large-less personal attention.	2	3	3	3	4
9.	I respect a man with a college education.	4	3	3	2	2
10.	College education should be free to all who want it and can qualify.	4	3	3	3	3
11.	More adult education should be available to farmers.	4	3	3	2	3
12.	A college education for a farmer costs more than it's worth.	2	2	3	3	4
13.	Teachers are definitely underpaid.	4	3	3	3	3
14.	School training is of little help in facing the real problems of life.	2	2	3	3	4

Attitude Inventory (Continued)

Item	Response Weights
15. Consolidation is a poor idea because small schools provide better education.	2 2 3 3 4
16. Education is to blame for burning of draft cards and university riots.	1 2 3 3 4
17. High schools should concentrate on preparing people for college.	4 3 3 3 3
18. Good adult farmer classes are worth many days, weeks, or years of actual farm experience.	4 3 3 3 3
19. Parents should be willing to let their children go into debt for more education.	4 3 3 2 3
20. All people, whether or not they have children in school, should be taxed for education.	3 3 3 3 2
21. Education is a source of new social ideas.	4 3 3 3 1
22. No one has an excuse for being ignorant.	3 3 3 3 3
23. It would be a poor idea to join together school districts so none would have fewer than 1500 students.	3 3 3 3 3
24. Public schools provide education for persons of all ages who need and want training.	3 3 3 3 4
25. Well-educated youngsters get good jobs and leave the local community.	3 3 3 3 3
26. Education is good even if it only helps parents to help their children with homework.	4 3 3 3 3
27. Farmers who have gone to college seem to enjoy life more.	5 3 3 3 2
28. Education should be compulsory through 14 grades.	4 3 3 3 3

Attitude Inventory (Continued)

	Item	Response Weights				
29.	Federal aid to education should be avoided.	3	3	3	3	4
30.	Public school teachers are the most important people in the community.	4	3	3	3	3
31.	I wish I could have learned more about math and science when I went to school.	4	3	3	2	2
32.	Young people are getting too much education.	1	1	2	3	4
33.	I wish I could have gone to school for more years than I did.	4	3	3	2	2
34.	Our schools encourage an individual to think for himself.	4	3	3	3	3
35.	The most important part of a boy's education should be obtained through hard work at many tasks around the farm.	1	3	3	3	3
36.	A farmer can get all the information he needs from farm publications and county agents.	1	3	3	3	3
37.	Parents should be willing to go into debt so their children could have more education.	5	3	3	3	2
38.	Bigger schools have better teachers and books and more money to keep up with the recent trends in education.	4	3	3	3	2
39.	Not finishing high school is a great handicap.	3	3	2	2	3
40.	Consolidation is a good idea because it is more economical-better facilities at less cost.	5	3	3	3	2
41.	Consolidation is a good idea because larger schools attract better teachers.	5	3	3	3	2

ATTITUDE INVENTORY ITEMS AND RESPONSE WEIGHTS FOR FARMING SCALE

	Item	Response Weights				
1.	Young farmers should have a goal of owning their own land someday.	4	3	2	3	3
2.	Bankers are interested in receiving the highest possible interest rates, regardless of the effect on farmers.	4	3	3	3	4
3.	I like to try new farming ideas.	4	3	3	3	3
4.	Betting only on good chances is generally a good policy.	5	3	3	3	4
5.	You've got to work year 'round in farming.	3	3	3	3	4
6.	New ideas in farming have to be tempered with the old.	4	3	2	3	3
7.	The farmer is more likely to enjoy his work than are most city people.	4	3	3	3	3
8.	It takes more management ability to operate a farm than any business in the city.	4	3	3	3	4
9.	Credit should be used as a part of the operating funds in the farm business.	4	3	3	3	3
10.	Too much farm production has caused low farm income.	4	3	3	3	4
11.	The only real wealth is produced by the farmers.	4	3	3	3	3
12.	A lot of ambition could offset the need to use borrowed money in farming.	4	3	3	3	3
13.	A farmer needs to specialize to stay in business.	4	3	3	3	4
14.	Using credit releases cash that can be spent on other things.	4	3	3	3	4

Attitude Inventory (Continued)

	Item	Response Weights
15.	We find it best not to be the first to try a new farming method.	5 3 3 3 4
16.	Prices should be left free without controls to guide farm production.	4 3 3 3 4
17.	There is not enough research in agriculture.	4 3 3 3 3
18.	Farmers who don't use new ideas don't stay in farming very long.	4 3 3 3 4
19.	Farmers have had too little advertising of their products, thus causing low farm incomes.	4 3 3 3 3
20.	Borrowing puts a farmer at the mercy of the lender.	3 3 3 3 4
21.	Farmers should plan the next year's farming operation years ahead of time.	4 3 3 3 4
22.	A farmer should be conservative about spending.	4 3 3 3 4
23.	A farmer should be aggressive and not always bet on a sure thing.	4 3 3 3 1
24.	Farming decisions should be based mostly on experience.	5 3 3 3 2
25.	Because some farmers can raise crops for a lot less cost per acre, some families are being forced out of farming.	5 3 3 3 4
26.	Controlling a lot of land is important in the competitive business of farming.	3 3 3 3 4
27.	I don't like to be in debt.	3 3 3 3 3
28.	A farmer should exchange work with a neighbor instead of hiring things done.	4 3 3 3 3
29.	The less government in business activities, the better.	4 3 3 3 3
30.	An ideal farm is one on which all the work can be done by the farmer and his family.	4 3 3 3 3

Attitude Inventory (Continued)

	Item	Response Weights				
31.	Farming is important to me because of working the soil, living close to nature, and being away from the fast pace of city life.	4	3	3	3	3
32.	Once out of debt, a farmer should try and stay out.	4	3	3	3	3
33.	Being your own boss is the best part of farming.	4	3	3	3	1
34.	Good hard work and lots of it is the only good way to be a successful farmer.	4	3	3	3	3
35.	Farmers should use credit only when absolutely necessary.	4	3	3	3	4
36.	Farming can't be done without records.	3	3	3	3	5
37.	Most articles in farm magazines are impractical.	4	3	3	3	4
38.	The land is the foundation of the family.	4	3	3	3	3
39.	Farmers should use some of their savings to expand their farm operations.	4	3	3	3	3
40.	Too much over-all production due to high price supports causes low farm income.	4	3	3	3	4
41.	Farmers should be careful about using new methods and products until they have seen them work on other farms.	5	3	3	3	4
42.	I think I'm among the first to adopt a new farm practice.	4	3	3	3	3
43.	Government should help beginning industries get started.	5	3	3	3	3
44.	Current high cost of production items has caused low farm income.	4	3	3	3	3

Attitude Inventory (Continued)

Item		Response Weights				
45.	The most successful farmer is one who is the best leader in the community.	5	3	3	3	3
46.	Farm prices being set by private marketing organizations has caused low farm income.	4	3	3	3	4
47.	The most successful farmer is one who has interests and rewards that don't depend on income.	4	3	3	3	4
48.	Farm management education helps a farmer do a better job of farming.	3	3	3	3	5
49.	Instead of depending on savings, a farmer should use credit in expanding and operating his farm.	4	3	3	3	4

ATTITUDE INTERVIEW

Name________________________________School________________

Adult Voag Instructor____

Size of farm in acres________Tenure: O__R__P__OR__RP__ORP______

Age: Husband_________________Wife___________________

Kind of post-high school education (if any)

Education: Husband__________________

Wife_____________________

What organizations are you in?

	Attendance	Offices (last 5 yrs)	Committees (last yr)
Farm			
Religious			
Other			

EDUCATION

1. Is education important to a farmer? Yes___No___
   If yes, what kind?

   How much?

   College?

2. Do you wish you could have gone to school longer: Yes___No___
   Comments:

3. Do you have any children: Yes___No___
   If yes, age and sex:

   If yes, do you have any plans for their education beyond high school?

4. What do you think of:
   The local school system:

   Area vocational school:

   Junior College:

   one of these

   State College:

   Private Schools:

   University:

5. What do you think about school consolidation?

Have you ever heard of the "Domain Report"? Yes___No___
If yes, what do you think of it?

6. Are you a school board member? Yes___No___
If yes, what is the biggest problem in your school district?

7. Do you have any sons in high school voag? Yes___No___
Comments:

8. How did you learn about the farm management program?

9. Why did you enroll in farm management education?

10. How many adult farm management classes did you attend last year?
Special enterprise meetings________
Only farm management______________

11. How many times did the adult voag instructor visit your farm last year?
Comments:

12. Have you had more than one voag instructor since you enrolled in farm management: Yes___No___How Many___
Comments:

13. What are the benefits of farm management instruction?

14. Do you think your attitude towards education has changed since you enrolled in farm management? Yes___No___
Comments:

15. Do you think your attitude towards farming has changed since you enrolled in farm management? Yes___No___
Comments:

FARMING

1. Would you (and your wife) please rank these goals?

Husband	Wife	Goals
____	1 ____	1. To make money
____	2 ____	2. To provide security for old age
____	3 ____	3. To avoid excessive risk
____	4 ____	4. To be free from debt
____	5 ____	5. To own farm of our own
____	6 ____	6. To have time for leisure and recreation
____	7 ____	7. To give our children the best possible education
____	8 ____	8. To have friends and be accepted in community
____	9 ____	9. Other (list)

2. What do you think are the 3 most important qualities of a successful farmer?
   1.

   2.

   3.

3. Does your wife help you with farm work? Yes___Field___
   No____Livestock___

4. What do you think is the latest new development in ___________ the enterprise?

   What is the most recent idea you have tried in this enterprise?

5. How long after learning about __________________ did you start using it?

6. What or who do you think is the most important source of new farming ideas?

7. If you needed some advice about farming, who would you go to first?

8. How did you decide how much fertilizer to put on last year?

9. What do you think of government price supports?

Other comments of government dealings in agriculture:

10. Who in your area is the farmer first to try new farming ideas?

11. Do you think of yourselves as a "progressive" farm family?
Yes____No____Comments:

12. How many farm magazines do you take?

13. What is the favorite enterprise on your farm?

Which do you think makes you the most money?

14. I'd like to ask you to rate how you feel about the following statement: Farming should be done for profit: (have husband and wife rate separately on a continuous scale of 1-100 slip of paper)

15. What do you think about the future of farming?

If you have (had) sons, would you encourage them to farm?
Yes____No____Comments:

16. What do you think are the risks in farming?

Which bother you most?

17. Do you consider yourselves conservative in spending money?
Yes____No____Comments:

18. Where do you think is the best place in your area to get a short-term loan?

What sorts of things would you borrow money for?

Interview Results

	Question	Responses	
1.	Is education important to a farmer?	Yes	100%
		No	
2.	What kind of education does a farmer need?	High School	25%
		Vocational Training	46%
		Adult Education	6%
		College	23%
3.	Do you wish you could have gone to school longer than you did?	Yes	27%
		No	73%
4.	Do you want your children to continue education beyond high school?	Vocational School	8%
		College	24%
		Further than H.S.	68%
5.	What do you think of the local school system?	No opinion	11%
		Fair	55%
		Better than I had	8%
		Good	20%
		Excellent	6%
6.	What do you think of the University of Minnesota?	No comment	8%
		No knowledge	25%
		Low opinion	17%
		Too large	6%
		Good	44%
7.	What do you think of school district consolidation?	Didn't save money	3%
		Schools too large	6%
		Has to be	6%
		May benefit	42%
		Good idea	24%
		No	19%
8.	Have you ever heard of the "Domain Report"?	Yes	62%
		No	38%
9.	What do you think of the "Domain Report"?	No comment	16%
		Not good	84%
10.	Do you have any sons in H.S. vocational agriculture, or would you encourage them to enroll if had some eligible?	Yes	49%
		No	51%

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Interview Results (Continued)

	Question	Responses	
11.	How did you learn about the farm management program?	Can't remember	8%
		FFA	6%
		GI-Vet program	25%
		Found out myself	3%
		Relative	6%
		Newspaper	3%
		County agent	8%
		Vo Ag Instructor	35%
		Others	6%
12.	Why did you enroll in farm management classes?	Right thing	11%
		Improve myself	8%
		Learn	21%
		Keep up with times	8%
		Keep better records	37%
		Improve financial situation	15%
13.	What do you think are the benefits of being in farm management classes?	Satisfaction	5%
		See where money went	17%
		Learn from others	28%
		Make more money	6%
		Change enterprise	3%
		Help in records	30%
		Third party view	3%
		Know people	3%
		None	5%
14.	Do you think your attitude toward education has changed since you've enrolled in farm management classes?	Yes	51%
		No	49%
15.	Do you think your attitude towards farming has changed since you've enrolled in farm management classes?	Yes	79%
		No	21%

16. Would you and your wife rank these life goals in order of their importance to you?

	Rank								
	1	2	3	4	5	6	7	8	9
1. To make money	4	3	3	8	11	3	23	11	4
2. To provide security for old age	6	3	3	10	12	6	21	7	2
3. To avoid excess risk	11	4	3	6	13	9	8	15	1
4. To be free from debt	8	12	6	9	8	6	10	11	
5. To own a farm	9	9	11	7	9	15	4	6	
6. Have leisure time	7	17	12	7	5	16	2	4	
7. Give children best possible education	8	11	15	9	7	9	2	8	1
8. Have friends and be accepted	15	9	16	13	4	4	1	7	1
9. Other									

Interview Results (Continued)

Question	Responses	
17. What are the three most important qualities of a successful farmer? (Results: items ranked first only)	Good Manager	10%
	Accepts change	7%
	Knowledge	6%
	Happy & healthy	12%
	Ambitious and hard worker	54%
	Interested	3%
	Careful	3%
	Determined	3%
	Neighborly	3%
18. Who in your area is the first to try new farming ideas?	None	3%
	All farmers	11%
	Others	7%
	Self	79%

REVISION OF THE INSTRUMENT

Introduction

Because of the suggestive findings of the analysis using the original instrument, there was empirical support for attempting to revise the instrument with several objectives in mind:

a) to make the instrument more reliable and valid.

b) to eliminate items specific to Minnesota farm families so that the questionnaire could be applicable in any farming community in the United States.

c) to perform statistical analyses of the responses on the revised questionnaire to determine the similarity or difference between results using the original versus revised editions.

There was neither time nor money available to actually revise the instrument. What follows is a brief outline to provide a guide to further research in the same problem area.

Design

Five groups of questionnaires could be sent to farmers and their wives in December, 1969. There would be several overlapping items on the education and farming scale to provide an estimate of reliability and also, if the common items are responded to similarly between groups, it would be possible to say all items would probably be answered similarly. In this way a larger domain of items could be sampled even though one person would respond to only 85 items. Table A shows how, using the education scale as an example, the items would be distributed among groups and shows how there would be some overlap of items between groups.

Table A. ITEM SAMPLING PLAN FOR FARM FAMILY ATTITUDE INSTRUMENT REVISION

Education Scale

Group I
Items 1 through 40

Group II
Items 25 through 65

Group III
Items 50 through 90

Group IV
Items 75 through 115

Group V
Items 100 through 140

The farming scale would be devised using a similar plan except there would be 45 items in each group instead of 40.

The sampling plan would involve farm families with various amounts of farm management education inputs. The criterion group would be those farm families who have enrolled for management instruction, but have not yet attended classes. There would be a control group of farm families randomly selected from Agriculture Stabilization Committee (ASC) lists with no management instruction. There would also be farm families with from one to ten-or-more years of instruction. Table B presents the sampling plan with the number of families in each category.

Table B. THE FARM FAMILY SAMPLING PLAN FOR THE INSTRUMENT REVISION

	Years of Participation												
	0	E[a]	1	2	3	4	5	6	7	8	9	10+	
Farm Families with Farm Management													
Group[b] I		20	20	20	20	20	20	10	10	7	6	10	163
II		20	20	20	20	20	20	10	10	7	6	10	163
III		20	20	20	20	20	20	10	10	7	6	10	163
IV		20	20	20	20	20	20	10	10	7	6	10	163
V		20	20	20	20	20	20	10	10	7	6	10	163
													n = 815
ASC Farm Families													
Group I	100												
II	100												
III	100												
IV	100												
V	100												
													n = 500
												GRAND TOTAL	1315

[a] E represents farm families enrolled but who had no instruction in farm management.

[b] Groups represent the five versions of the instrument, each of which will have several overlapping items.

The questionnaire format could be very similar to that used in the original study. There would be a blue copy for husbands and a pink version for wives. The same general mailing and follow-up procedures could be employed.

Statistical Analysis

The only major change in the statistical analysis would be the method of determining which items to include as components of the revised instrument. Items would be retained which discriminate between the criterion group of farm families with no instruction and those farm families with various amounts of farm management instruction.

Although it would necessarily be based on few observations per item, the curvilinear regression technique could be used to determine the nature of the relationships between instruction and attitudes.

Summary

By using more items initially and selecting a larger sample, the reliability and validity of the revised instrument should lead to more decisive conclusions about the relationship between instruction and attitudes and lend more confidence to any results. Besides, with an instrument designed for use in any farm family situation, there would be a potential for other researchers in other states to study the attitudes of farm people toward certain aspects of education and farming.